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VIEWS, NEWS AND INTERVIEWS.

Nantucket, that little island in the Atlantic, 30 miles off the Massachusetts coast, is one of the most interesting and quaintest places imaginable. The people and their doings have often been mentioned in prose and poetry. An original genius, an electrician of the name of Nason, has recently taken up his abode on the island, and has not hesitated to advertise himself in the local papers. One of his advertisements which recently appeared in the Nantucket *Inquirer and Mirror*, is as follows:

IS HE HERE?

I have so much new work offering that I need the assistance of another bright young man—prefer one who hates dirt, and can see a hole in a ladder without a microscope; has no inherited inclination to nurse a rocking chair during business hours, and can tell the difference between a monkey wrench and a feather bed without laying off two weeks to consult an encyclopædia. Apply to NASON.

Mexico has 22,500 miles of telegraph lines.

For a man who so frequently stands in his own light, Edison's success is certainly phenomenal.—*New York Truth.*

A new stamp is to be issued in Great Britain of the value of fourpence halfpenny—nine cents—to be available for all postal, telegraphic and revenue purposes. It will be the first stamp issued of this value, and its issuance is called for by the new features of telegraph and parcel-post business.

One of the employments of electricity just now is to make "winkers" to hang from high places. They are incandescent lights, hoisted on a flagpole or run out from a window, and the current is interrupted and turned on again by clockwork mechanism. A man sees the light, then he notices that it is gone. While wondering what has become of it, it reappears. This is supposed to rouse his interest to such an extent that he will ask somebody what it is for, and the man who displays the light will then get an advertisement—if he has luck.

Experiments with different kinds of lights for libraries show that 550 hours of an electric light of 144 candle-power produced no yellowing effect upon the leaves of books, while 240 hours of a 50-candle gas light produced a noticeable change of tone.

In reference to the use of electricity as a motive power, President Clark, of the New York, New Haven and Hartford Railroad Company, in his annual report, which will be submitted to the directors at their annual meeting on October 19, says: "If electricity as a motive power becomes commercially practicable, the two interior tracks of the four now in process of construction between New York and New Haven, with their improved grades and alignment and absolute freedom from grade crossings, will prove especially adapted for its use." Vice-President Tuttle says: "We discussed that matter at great length before incorporating it in the report. It is given out as a suggestion. We are four-tracking the road from New York to New Haven, and we are eliminating all of the grade crossings. If at some time electricity has so far developed that it will be practicable to use it, the road will be one of the first to adopt it. Of course, we cannot tell when it will be done. Electricity has been making rapid strides in the past ten years, and it will make strides in the years to come."

Western Union, according to Mr. Jay Gould, will sell at 110 before April 15 next.

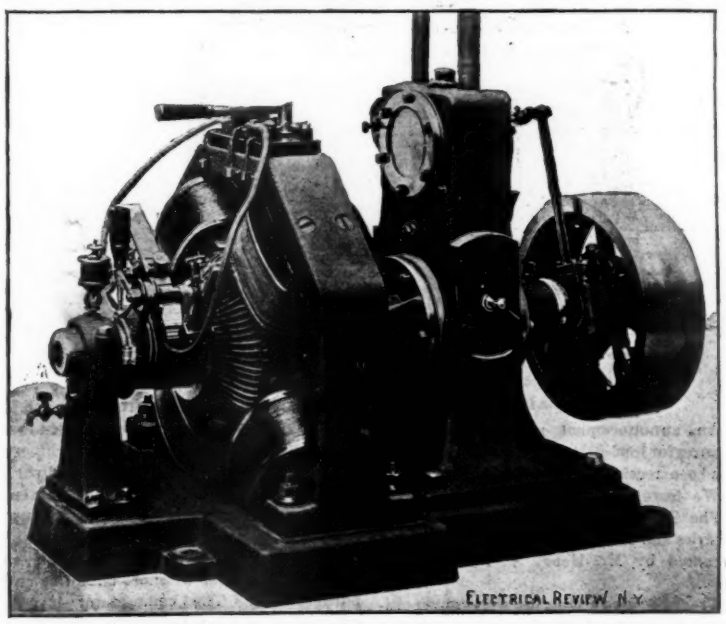
Mechanics' Lien—Electric Light.

The Supreme Court, of Kansas, held, in the recent case of Badger Lumber Company *vs.* Marion Water Supply Company, reported in the Chicago *Legal News*, that an electric light company having a franchise to occupy the streets is not so distinctively public in its nature and operations as to exempt its property from the application of a statute relating to mechanics' liens. The court said: "The general rule is that the public property of a municipal corporation is not subject to seizure and sale, and it is generally held that a mechanic's lien cannot be enforced against property which is not subject to sale on execution. The reason for this exemption is that such corporations are instrumentalities of the government itself, and the seizure and sale of the public property would interrupt and suspend the functions of government, and also that other provisions have been made by law for the collection and payment of public obligations. Corporations, however, such as the one claiming exemption here, although they serve the public convenience to some extent, are not organized merely for public advantage, but are operated largely for the private benefit of the incorporators. In this State such corporations may mortgage or sell their property, and the general rule is that the property of a corporation which may be sold under a mortgage or specific lien given by the owner may be subjected to a mechanic's lien. If a corporation may, by its voluntary act in creating a specific lien, subject its property to seizure and sale, it is difficult to find any substantial objection in allowing and enforcing the claim of a laborer or material man against the same property under the mechanics' lien law."—*Bradstreet's.*

A New Thomson-Houston Marine Dynamo Set.

The Thomson-Houston Electric Company has recently designed and brought out a marine incandescent dynamo set, which is especially compact and light. The dynamo is known as the "M. P., 3½," and is of the compound wound multipolar type. It regulates within 2 per cent. on full load to no load. The output is 35 amperes at 100 volts and the speed of the armature is 800 revolutions, with an initial steam pressure of 100 pounds.

The armature, spools and frame, after a six-hours run at full load, showed an increased temperature over the surrounding air of 50°, 40° and 29°, respectively. The commutator connections are cross-connected, using only two sets of brushes, placed 90° apart. The rheostat is incombustible. There are self-oiling bearings on the engine and dynamo, as well as sight feed oil cups.



THOMSON-HOUSTON MULTIPOLAR INCANDESCENT DYNAMO COUPLED DIRECTLY TO CASE ENGINE.

The floor space occupied by the set is 40 inches by 24 inches. The total height is 27 inches, and the weight of the set, including extras, is 900 pounds. Our illustration shows a 3½ horse-power set; another size, of 8 horse-power, is also made.

The engine is one manufactured by the J. T. Case Engine Company, of New Britain, Conn. The armature shaft of the dynamo and the shaft of the engine are identical, being connected by a flexible coupling. The engine is remarkable for its simplicity, and has many advantages to recommend it for the use to which it has been put in this instance. The extreme lightness of the moving parts and their direct action on the crank make it possible and practicable to attain high speed with very little vibration.

A new steam engine of 25 horse-power has just been presented to the mechanical department of Brown University, by the Armington & Sims Engine Company.

ALWAYS A WELCOME VISITOR.

THE PRESIDENT OF THE CENTRAL ELECTRIC COMPANY WRITES SOME VERY NICE THINGS ABOUT THE "ELECTRICAL REVIEW."

TO THE EDITOR OF ELECTRICAL REVIEW:

I feel it incumbent upon me to acknowledge gratuitously the particular value that the advertisement we are carrying in the REVIEW is to us. Our inquiries for catalogues, circulars, prices, etc., are from far and near, and from the right sort of people, too—those who buy—not the dabblers in the business. Perhaps it is the attractiveness of the goods we have to sell, but we are inclined to the belief that this is not the whole reason, but that your paper is entitled to no inconsiderable share in the success we are having.

We notice with interest, also, that you have added a new department to your paper, viz., "Advance Information Department." This we find to be of service in many ways, and we commend the REVIEW for its enterprise.

The paper is always a welcome visitor, the news columns being bright and readable, and we wish it ever increasing success.

Yours truly,

(Signed) W. H. MCKINLOCK,
Chicago, Ill., Oct. 5. President.

Platinum Mines of Russia.

The platinum beds of the Ural mountains, according to the *Journal de la Chambre de Commerce de Constantinople*, "are the only ones in the world in which this metal is found in grains. Platinum is found in Brazil and in the Cordilleras in the hard serpentine rocks, but never in the form of grains. The platinum beds of the Ural mountains are found in various districts. In the north, at Besserski, in the government of Perm, in the district of Khotourski, and in the State properties of Goroblagodatski, where 66 mining concessions have been granted. All the beds of the northern region are situated in the basin of the river Touri, in that of the tributary stream of Taghil, and in other tributaries higher up. On the western declivity of the Ural mountains there is another platinum bed near the river Outka, a tributary of the Tchoussova, and the basins of the higher tributaries of the Outka, near the Ural river. The platinum found in these places is in the form of grains, in sand frequently containing gold. The weight of these grains is from 17 to 21 grams to every 1,640 kilograms of sand."

Hullo! Who Ever Gave This Away!

[*Texas Siftings.*]

The Boston girl never hollers "hullo" at the mouth of the telephone. She simply says, as she puts the receiver to her ear:

"I take the liberty of addressing you *via* a wire surcharged with electricity."

The Last Words of a Disappointed Promoter.

To the Editor of Electrical Review:

I hope when this letter reaches you I will be gone forever. You may, perhaps, think that this is a commonplace remark, but let me assure you that you are the cause of the world's losing a shining light, and of preventing the public at large from reaping the benefits arising from my scheme, which I will now unfold to you.

As the lay press has seen fit to scare the public into the belief that the trolley cars were nothing more than traveling guillotines and perambulating chairs for their electrocution, I conceived the brilliant idea (though I say it, who shouldn't) of furnishing the public with what I had intended to call "The Municipal Protective, Funeral, Burial and Benefit Association."

You will see from the following description how feasible my plan was, and how you have seen fit to deprive me of the only means I have ever had for the making of my fortune.

If you had continued to allow the press to keep up "its frothing at the mouth," my scheme would have taken firm hold on the affections of a generous public, and my association would have thrived; but, as it is, all my hopes are shattered, cast to the ground like a cheap plaster image.

The public would have been so frightened that they would have been glad to invest in my stock, and I would have shortly rivalled Jay Gould, but now all is over (excuse the ravings of a demented and disappointed promoter), and the scheme has fallen through the hole that you, the Editor of the Electrical Review, have seen fit to make for me, unintentionally, I admit.

Pray, excuse my delay again, but as this is the last letter that I write in this world, overlook my defects.

The following is the plan whereby the widows, orphans and relatives of those murdered by the "deadly trolley cars" would benefit and make them independent for life, likewise giving the deceased a decent burial, which would be both expensive and respectable, with suitable newspaper notices and obituaries:

On each and every car of the line I had intended to put a box, wherein would be placed a number of strips of paper on which would be engraved different ornamental policies as herewith arranged. These would be placed in different grooves beautifully protected by beveled glass mirrors, and by the dropping of a 5, 10, 25 or 50 cent piece the person would receive a ticket or coupon, and would be entitled to the following benefits:

The owner of a 5 cent coupon would be entitled, if found dead (as a result of "the trolley car's Juggernautic career") with it in his possession, to a first-class funeral, viz., one hearse and ten carriages and a casket of unique design, with electric blue trimmings, so as to indicate in a delicate way to the bereaved family the supposed nature of the deceased's death. The handles, if desired, could be made of some ornamental cable, decorated with polished brass binding posts.

The owner of a 10 cent coupon would be entitled to the same funeral and burial as the owner of a 5 cent coupon, but in addition the widow or relatives would receive the sum of $100, which they would be advised to invest in our stock or some other as safe, such as the Chemical Bank.

The owner of a 25 cent coupon would be entitled to the benefits aforementioned and the additional sum of $500, which would be paid in monthly installments of $10 each. This would be done in order that the beneficiary should not be injured by the extraordinary and sudden acquisition of so much wealth.

The owner of the 50 cent coupon would receive, in addition to the above, the sum of $1,000 in stock of this company, and as a precaution, if too many were to invest in these policies, we could issue more stock, if necessary.

You will see that my faith in the security of the trolley system was unbounded, otherwise I would never have put forth such magnificent inducements, as with a promise of such large reward many might be tempted to commit suicide by carefully scraping the insulation from a wire somewhere in the circuit, and by holding the rail with one hand and the wire with the other, he might receive a shock which would knock him down and allow the car to run over him, if the brakeman did not see him in time. But the difficulties attending suicide by this means are so great that I seriously doubt if there would be any so industrious as to kill themselves by this inconvenient and troublesome way.

But, alas, you have told the public that the trolley and the trolley cars are not dangerous, and I am discovered at last—my scheme has fallen through the hole. My only hope is the grave, and you can rest assured that I shall not kill myself by means of electricity; I shall choose something easier. I have not made up my mind as yet, but by one of the following list will I end my miserable existence: By gas, poison, cholera, hanging, kerosene lamp, horse or cable car.

Farewell, and remember it is by you that I have been destroyed. Prejudice.

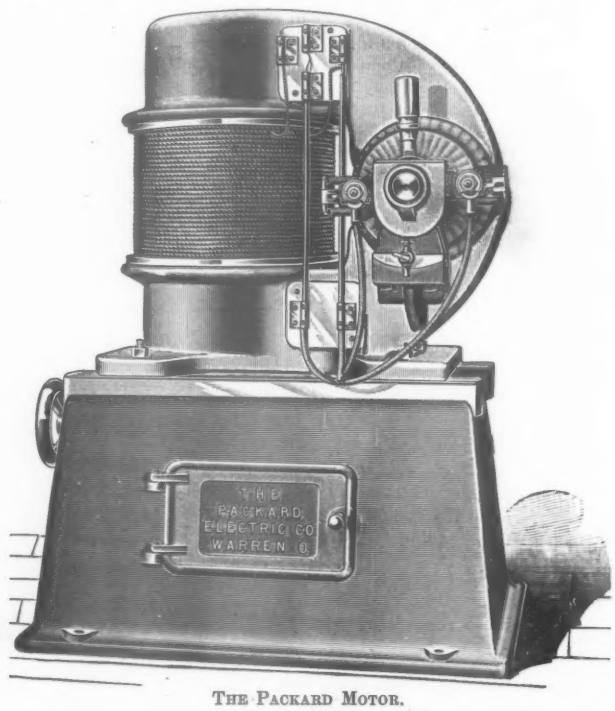
New York, October 15.

The Packard Motor.

The Packard Electric Company, of Warren, Ohio, of which J. W. Packard is president and W. D. Packard is secretary and treasurer, have put upon the market a new motor, which we illustrate on this page.

The field is built up of wrought iron bars held in place and shaped by a coating of soft cast iron. The wrought and cast iron unite and form one solid mass, thus enabling the designer to secure a tremendously strong magnetic field by the expenditure of a very few watts of electrical energy. There is but one field coil wound upon a movable spool and but one joint in the magnetic circuit of the machine. The construction is such that the removal and replacement of the field coil is extremely simple. This is an important item, as every part is built to a gauge and the user has only to order another field coil and armature and he can change the voltage of the machine to 110, 220 or 500 volts in a very few minutes.

All machines are mounted on a hollow cast iron base which is fitted with a door and designed to be used as a closet for the reception of tools, etc., and are also provided with a belt tightener. They are insulated from this base by hard wood.



The Packard Motor.

The armature is of the drum type and is built up of thin disks securely fastened to a shaft made of the best grade of machinery steel of greatest diameter in its central part. The winding is a modification of the Siemens method, and the armature is so proportioned that there is very little idle wire over the ends. It is wound with the greatest care, so there is no danger of short circuiting and burning out. The commutator is constructed of a large number of sections of pure, hard copper, insulated throughout with mica, and has ample width of face to secure the best results and reduce the wear to a minimum. A strong point in favor of these machines is freedom from sparking at the commutator. The brushes having been once set at the non-sparking point, require no changing under extreme changes in load. The magnetism of the field is so powerful relatively to that of the armature, that no distortion of the lines of force is produced, and consequently the line of communication remains unchanged, regardless of changes of load.

Self-oiling boxes are used on all the Packard motors and dynamos. They are provided with interchangeable bearing sleeves of hard composition turned true to gauge. The wrought iron filled field requiring very little current in the coil to maintain its magnetism, short magnetic circuit of very low resistance, superior electrical and mechanical construction, and low resistance of the armature, gives a motor or dynamo of very high efficiency. These machines are self-contained and self-regulating, the speed remaining practically constant under all changes of load. The general design of these machines and their superior mechanical construction make them extremely durable, and not liable to derangement.

LITERARY.

An announcement and programme of lectures for 1892–'93, at the Franklin Institute, has been received.

We have received a pamphlet entitled "The Tariff: Its Bearings Upon the Industries and Politics of the United States," prepared by Mr. Henry V. Poor, of this city.

Franklin MacVeagh, the well known citizen and merchant of Chicago, writes with enthusiasm of "Chicago's part in the World's Fair," in the November *Scribner*. In regard to the much disputed question of the water supply, he emphatically says:

Mr. Howells has given the title of "The Coast of Bohemia" to his new novel of American girl life which is about to be published in *The Ladies' Home Journal*. The novelist says of the story that "it is about the prettiest thing I have ever done."

"The simple truth is that there will be no trouble with the water supply next year, as there is none now; for Chicago has now and will have then what it has always had, except for a few brief intervals (which cannot now occur), the most favorable water supply enjoyed by any of the great cities of the world."

Mr. Howells will begin in the November *Cosmopolitan* a department under the attractive title, "A Traveller from Altruria." Those who have seen the first two papers think they will equal in interest and in their wide appeal to all classes the "Breakfast Table Papers" of Dr. Holmes. In order to give the necessary time to this work, Mr. Howells has turned over the detail editorial work to Mr. Walker.

STREET RAILWAY AND POWER NOTES.

The Quinsigamond horse car line at Worcester, Mass., is being equipped with electric power.

Savannah, Ga., is to have a new electric railway, and work will probably be started within a few days.

Yarmouth, Nova Scotia, is the first town to have an electric street railway system in operation in the maritime provinces.

There is talk of building an electric street railroad from Richfield Springs to Canadarago Lake, N.Y., distance about one mile.

The San Diego, Cal., electric railway system has been completed and is now in successful operation. The plant cost $360,000, of which $250,000 was spent directly in the city.

Philadelphia is still holding out against the trolley. She will be holding out her hand for alms if she doesn't catch on to the procession of progress somewhere pretty soon.—*Buffalo Times.*

The New York Belting and Packing Company has declared an interim dividend at the rate of eight per cent. per annum on preferred stock and 10 per cent. per annum on common stock, payable October 17.

A party of Denver capitalists is seriously considering the advisability of building an electric line to Boulder and Louisville, and the people of Louisville have gone so far as to offer the site for a power-house and free coal for five years if the line will build to that town.

The underground electric railway in Paris, from the Bois de Vincennes to the Bois de Boulogne, will shortly be commenced, the municipal council having approved the scheme. The length is to be about seven miles, and the fares two—viz., 15 and 30 centimes. The concession is for 70 years, when the city is to purchase the lines, if it has not done so previously.

A Philadelphia syndicate, which includes Edward E. Denniston, John P. Ilsey, Stephen B. Haas, C. Ford Stevens and James Richardson, Jr., has arranged for the purchase of all the electric lines of the People's Street Railway Company in Scranton, Pa. They have already taken steps to secure a charter, and as soon as they obtain it they will assume charge of the road under the corporation name of the Scranton Traction Company. It is understood that they will undertake the experiment of running cars at five-minute intervals on all the lines.

The Joplin, Mo., Electric Street Railway and Motor Company may soon be running cars through from Joplin to Grand Falls. If satisfactory arrangements can be made with the Missouri Pacific Company, a trolley line will be extended from the street railway terminus at Blendeville along the Missouri Pacific branch to Grand Falls and cars will be run over this road. Both roads are of standard gauge and the street cars could be run over the Grand Falls branch very nicely. On account of the grades and the increased length of line additional power will be necessary, and if the project is carried out the plant at the Falls will furnish it.

The Twin City Street Railway has decided to give its interurban patrons between Minneapolis and St. Paul the very best service and equipment this winter that money can afford. To that end it has just placed an order with the American Car Company, of St. Louis, for twenty 34-foot vestibuled motor bodies of the most improved pattern. Both ends will be vestibuled with glass windows and doors, and to passengers and trainmen alike, traveling on the line with thermometer 40 below will be more of a comfort than it was last winter, especially to the motorneer, who has to buffet all kinds of weather from his exposed position. The cars will be models of beauty and skill. They will have cross seats, as in a railroad coach, with a center aisle running the length of the car. About 50 passengers will be able to find seats with this arrangement, and the smokers will occupy the rear vestibule.

THE NEW LAMP.

The Westinghouse Announcement of a Non-Infringing Incandescent Lamp Attracts Particular Attention—The Situation Analyzed—The Edison Claims in Full—Several Probable Lamps Discussed—The Work of Dr. Bohm and Dr. Moses—Which is the Lamp?

The announcement that the Westinghouse Electric and Manufacturing Company has lately made in the advertising columns of the daily and technical press, relative to a new incandescent lamp, has created much interest in electric lighting circles. The electrical and financial world are impatiently waiting for the appearance of the lamp in the market.

The Westinghouse Company in its advertisement says: "These lamps not only do not infringe the Edison patent referred to, nor any of the patents of other companies, but they are fully covered by patents of our own. The new lamp differs radically from those now in use. It requires no platinum, and is made in separable parts, so that the incandescent burner can be renewed and the bulb and other parts of the lamp used over and over."

For the benefit of those who are not familiar with the separate claims made by

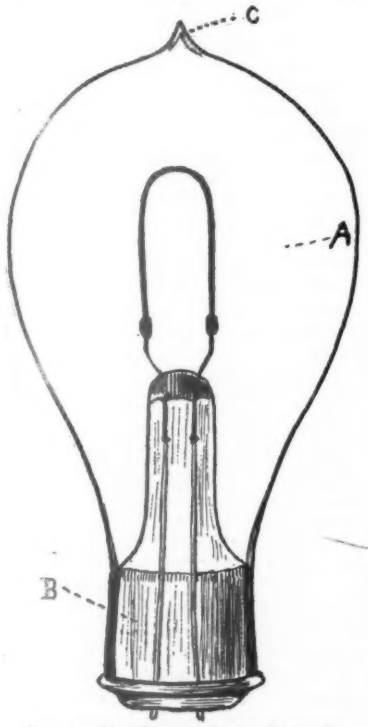


FIG. 1.—DR. BOHM'S GLASS STOPPER INCANDESCENT LAMP.

Mr. Edison in his patent, we reprint the following four claims:

"No. 1. An electric lamp for giving light by incandescence, consisting of a filament of carbon of high resistance made as described and secured to metallic wires, as set forth.

"No. 2. The combination of carbon filaments with a receiver made entirely of glass and conductors passing through the glass and from which the air is exhausted for the purposes set forth.

"No. 3. A carbon filament or strip coiled and connected to electrical conductors so that only a portion of the surface of such carbon conductors shall be exposed for radiating light, as set forth.

"No. 4. The method herein described of securing the platinum contact wires to the carbon filament and carbonizing of the whole in a closed chamber, substantially as set forth."

From the decision of Judge Wallace, lately confirmed by Judges Lacombe and Shipman, it is evident that the validity of this patent is based upon the interpretation of claim No. 2.

The claim distinctly reads, "The combination of carbon filaments with a receiver made entirely of glass and conductors passing through the glass and from which receiver the air is exhausted for the purposes set forth."

From this we see that the claim is for a "combination" of distinct elements. Edison did not claim to have invented the continuous glass globe, for Crookes' radiometers were already in existence before he began his work in electric lighting. The courts have recognized the existence of the precedent invention of Geissler of the hermetically sealed all glass vacuum tube, in which Mr. Edison has placed his incandescing carbon conductor, and they have granted to him the honor of having been the first to combine these elements into a practical lamp. But it must not be overlooked that two years before Mr. Edison was born, King, an American, who was patronized by Mr. Peabody, in London, publicly exhibited incandescent lamps contained in an exhausted glass receiver from which the air was kept excluded by a mercury stopper kept in place by atmospheric pressure. Several other distinguished inventors of incandescent lamps also used stop-cocks and cements for sealing their lamps, and made and exhibited them in public during lengthened periods, before Mr. Edison entered the field of incandescent lighting and turned his vast energies and resources towards the perfecting of his method of electric illumination.

One inventor, notably, a co-laborer of Edison, Dr. L. K. Bohm, turned his skill in glass blowing to account, and in 1880 perfected a stoppered lamp which is said to hold its vacuum for a very long time. In view of the immense interests at stake under the recent decision of the courts in the Edison and United States companies' suits, and the announcement by the Westinghouse Company of their intention to put a stoppered lamp on the market on the first of December, we feel that it will be particularly interesting to our readers and the general electric public to illustrate Dr. Bohm's stoppered lamp.

Another well known electrical engineer still further perfected the stopper lamp by using platinum instead of glass and cements. Dr. Moses' lamp, which was shown at the convention of the National Electric Light Association in February, 1886, contained, however, other improvements, namely, its extreme simplicity and the beautiful effects produced by its peculiarly curved incandescing conductor.

A perfect incandescent lamp should not contain more than one-millionth of an atmosphere. While the vacuum is being made the lamps are attached to the pumps by ground glass stoppers, and during the process of evacuation that attenuation will continue; and it is said that such a vacuum may be made lasting in spite of the large surface of the stopper. All that is necessary in Dr. Bohm's lamp, as he claims, is a perfectly accurate grinding together of the two surfaces of the neck and stopper. Where the platinum stopper is used, as in Dr. Moses' lamp, the stopper is exceedingly small, and but a very inconsiderable area exists for the extrance of air into the bulb between the neck and the stopper. The difference of construction between Mr. Edison's lamp and these two stoppered lamps is apparent.

In the drawing of Dr. Bohm's lamp, "A" represents a glass globe having a ground glass neck. "B" is a ground stopper fitting most accurately into the ground neck of the globe. This stopper continues into the chamber thus formed and is sealed at its enclosed end. Passing through it are two platinum leading in wires to which are attached the incandescing carbon. After the stopper has been carefully fitted into its place, the lamp is exhausted through the bottom of the glass globe at the point "C," which is afterwards sealed.

We also give a cut of Dr. Moses' lamp, which consists of a simple glass globe made of a single piece, the mouth of which is closed by a platinum stopper. In this lamp there are several meritorious features; it is made of but a single piece of glass, has a very long and symmetrical incandescing conductor ingeniously curved so as to avoid vibrations, and is devoid of the objectionable teat, which, in all other known lamps, refracts the light unevenly in passing through the point of fusion where the glass globe is invariably hermetically sealed.

On November 22, 1880, Dr. L. K. Bohm made application No. 20,978 for a patent in which he states, in one of his claims, that he has invented "an electric lamp, consisting of a separable globe or bulb and of a base part and support, said parts being cemented by a hermetically sealed and ground joint, substantially as and for the purpose set forth in the accompanying description."

The Patent Office rejected this application on November 22, 1880; and stated that claim No. 1 (above referred to) was "fully anticipated by the patent to Sawyer & Man, No. 205,144, issued June, 18, 1878."

On December 10, 1880, the report from the Patent Office stated that "Claim No. 1

FIG. 2.—DR. OTTO A. MOSES' PLATINUM STOPPER INCANDESCENT LAMP.

of the above named application is met by the patent of Maxim, 230,953, August 10, 1880; broadly considered, a claim for a ground glass stopper in an electric lamp is not patentable."

Upon application being made, the commissioner, Marble, declared that "the claim was too broad and could be met by any ground stopper and glass jar which can be found in any drug store." This claim was, therefore, again rejected on March 2, 1881.

The patent of Sawyer & Man, No. 205,144, June 18, 1878, is said to be the one under which the Westinghouse Electric Company will manufacture their new lamp. But we will soon see what we will see.

Boone, Ia., is to have five miles of electric railway.

Rockville, Conn., will operate a municipal electric light plant.

An extension of the Seymour, Ind., telephone line north to Columbus and south to Crothersville is asked for.

FIG. 3.—ANOTHER VIEW OF DR. MOSES' LAMP, SHOWING FORM OF FILAMENT.

The Columbus, Ind., telephone line is to be extended to Shelbyville, taking in the intermediate towns and villages.

The Western Union Telegraph Company is about to expend considerable money in improving their lines in and about Fort Worth, Tex.

Work on the new Postal Telegraph building in New York is progressing rapidly. The foundations are remarkably substantial, and the structure when completed will be one of the finest office buildings in New York.

The New York Electrical Society.

NEXT MEETING IS HELD OCTOBER 19TH.

This institution, founded in 1881, is the oldest existing electrical society in this country, and its usefulness is extending from year to year. The object for which the society was established was to afford all who are interested in electricity, whether as a science or as an art, an opportunity of coming together for interchange of ideas, and to increase their knowledge by annual courses of lectures, which have been a feature of the society's work since its inception.

Following its usual custom, the society proposes this year to continue its course of lectures, which will comprise 15 in all, embracing the following subjects, and with the names of the lecturers, where their services thus far have been provided for:

1. The arc light (with experiments), by Mr. R. S. Dobbie.
2. The telephone (experimental), by Mr. J. J. Carty, electrician Metropolitan Telephone Company, New York city, and Mr. F. A. Pickernell, engineer American Telephone and Telegraph Company (long distance company).
3. How to lay out and wire an isolated lighting plant, and how to operate it, by Mr. Aug. Noll, superintendent New York Electric Equipment Company.
4. Primary batteries (with exhibit of various batteries), by Mr. G. d'Infreville, late electrician Western Union Telegraph Company.
5. Electricity in medicine (experimental), by Dr. Wm. J. Morton.
6. The progress of the year, by Mr. Joseph Wetzler.
7. What Europe is doing in electricity, by Prof. F. B. Crocker.
8. The magnetic field, by Prof. E. J. Houston.
9. Insulation and surface leakage (with experiments), by Dr. J. B. Williams.
10. Electric heating (with experiments).
11. The storage battery.
12. The continuous current motor (with experiments).
13. The alternating current motor (with exhibit).
14. Electric railways.
15. The incandescent light.

In order to attain the full measure of its usefulness, and to encourage beginners to associate themselves with it, the society makes no distinction whatever in the grade of its membership, to which any person interested in its work is eligible without examination of any kind as to his knowledge of the subject.

An invitation is extended to all amateurs, students, artisans, manufacturers and others interested in the progress of electricity, to join the society and aid it in its work.

The dates and meeting place for the lectures will be announced in due season. Admission, which is free, can only be gained by non-transferable tickets, which can be had on application to the secretary. The annual dues to the society are $3, and the secretary, Geo. H. Guy, Room 812, 203 Broadway, New York city, will furnish blank forms of application for membership on request.

The 146th meeting of the Society will take place at Columbia College on Wednesday, October 19, at 8 P. M. Prof. F. B. Crocker will deliver an address entitled, "What Europe is Doing in Electricity," in which he will describe the numerous electrical establishments visited by him during a recent trip abroad. Prof. Crocker will point out specially the differences between our methods and those in vogue abroad, illustrating his remarks by photographs, which will be exhibited.

"It Gets Better Every Week."

[From the Baltimore *American*.]

Under the editorship of Mr. Charles W. Price, the ELECTRICAL REVIEW has taken the leadership of electrical journalism. It gets better every week. Its news currents grow stronger, and its editorial incandescence shines forth with increased and increasing enlightenment to the world.

How New Yorkers Communicate With Each Other and With the World at Large.

THE TELEPHONE SYSTEM.

New York's system of telephone communication is conducted so unobtrusively, and maintained with so little friction, that it is almost the last thing which a visitor to the metropolis would think of investigating. Most people coming to New York for the first time are astonished at the signs displayed in all the elevated railroad cars, stating that 500,000 passengers are carried daily by the elevated roads. If the volume of the telephone business of New York were calculated in the same way, it would be found that 60,000,000 people use the telephone in New York city every year. This vast business is in the hands of the Metropolitan Telephone and Telegraph Company, with headquarters at No. 18 Cortlandt street, where, in a substantial fire-proof building, there is a switchboard that cost nearly $400,000. This switchboard is the largest and best equipped in the world. It has accommodations for 6,000 circuits or 12,000 wires, and is used for the down-town district almost exclusively.

In addition to the Cortlandt street office, there are similar buildings and switchboards at Spring and Thirty-eighth streets. There are also important central offices at Eighteenth street, Seventy-ninth street, Columbus avenue and Harlem. At Broad street there has been erected another model fire-proof telephone building, which is being provided with a large switchboard to take care of the increasing volume of business down-town. All of the subscribers' lines centering at these offices are conducted underground almost exclusively, and a comprehensive system of underground trunk lines connects the various central offices together. Hereafter anything like a serious break-down, due to storms or blizzards, which have heretofore interrupted communication in large cities, cannot occur in New York.

The equipment of subscribers' stations is of the highest class known to the telephone art; and it is possible to talk with entire satisfaction from metallic circuit subscribers' stations to any point reached by the long-distance wires, including Chicago and all intermediate points in the West; Baltimore and Washington at the South, and Boston and Portland in the East.

The present highly creditable condition of the New York telephone service has not been accomplished without an immense outlay of money and years of labor by a large technical staff which has been concentrated upon the work for a long time. To properly appreciate the magnitude of what has been done, it should be understood that the telephone system of New York, like that of all other large cities, both in this country and abroad, was constructed on the grounded circuit plan; that is, but one wire was employed to connect with each subscriber, the earth being used as a return, as in the case of the telegraph, which was the model followed by the early telephonists. Ten years of hard experience, however, demonstrated that satisfactory telephone business could not be accomplished over one wire; and notwithstanding the fact that the Metropolitan Company had already in existence a plant of switchboards and underground wires which cost well up into the millions, it all had to be abandoned to make way for the new class of service; so that not a foot of wire or section of switchboard which was in use six years ago is now in service at New York, all the cables being withdrawn from the ducts and the switchboards dismantled and sold for old junk. Such a technical revolution as this has no parallel in any other industry. As a result, New York leads in the character of its telephone service, as well as in so many other things. A fair idea of the multitude of details and practical difficulties of operation entering into the metropolitan telephone system can be had by an inspection of the plant at Cortlandt street, to which all subscribers, as well as visitors to New York, are admitted upon application at the general manager's office in the building.

The telephone business is unique in the commercial world, as being the only one which can be done cheaper on a small scale than in a wholesale way. The reason for this paradox cannot be stated in a few words; but it is due principally to the fact that, while the income from subscribers bears a direct ratio to their number, yet the cost of apparatus and the plant required to provide the necessary facilities for their inter-communication increases at a much greater rate. While the actual sum of money paid for the use of a telephone in New York is somewhat higher than in small cities, yet when the quality of service and the number of miles of wire over which the subscriber talks are considered, it may fairly be said that the New Yorker has the cheapest and the best telephone service in the world.

The Metropolitan Telephone and Telegraph Company has about 900 employés, 400 of whom are girls (who operate the switchboards at the various offices). This company was the first to comply with the Underground Law, and as a result there are nearly 500 cables under ground, containing nearly 40,000 miles of wire. In addition to the underground system, there are a large number of cables connecting with Brooklyn and other Long Island points, by the Brooklyn Bridge. Under the North River and Harlem River there is a complete system of submarine cables connecting the city with the North and West.

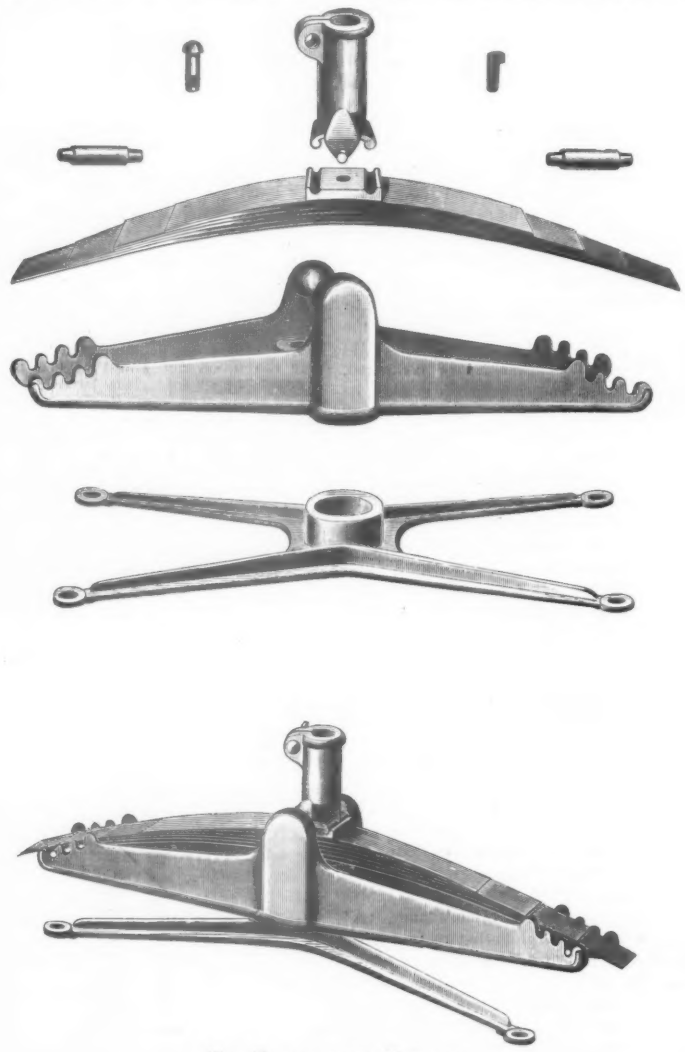
Altogether the problem of telephoning in New York has been solved in a manner whose success is reflected in the satisfaction expressed by a great majority of the subscribers of the company.

TELEGRAPHIC SYSTEM.

The United States possesses in the Western Union Telegraph Company the most complete and extensive telegraphic system in the world. The greater part of the continent is covered by this system as with a vast metallic net. Every city, town and almost every village is in telegraphic communication with the metropolis. The lofty red brick building at the Northwest corner of Broadway and Dey street contains the head offices of the Western Union Company. Local offices are conveniently situated in every district of the city, in all railroad depots and in the principal public and office buildings and hotels.

The Western Union Telegraph Company operates the two trans-Atlantic cables of the American Telegraph and Cable Company between Penzance, England, and Canso, Nova Scotia, connecting at the latter point with two cables which run to Coney Island, there connecting with an underground system of wires across Long Island, aerial cables over the Brooklyn Bridge, and subterranean wires in the streets in New York city to the company's principal cable office at 16 Broad street. From the cable landing at Penzance independent wires run to the company's offices in London.

The cables in New York are connected directly with the New York Stock Exchange and the other principal exchanges, so that messages concerning dealings in the different stocks and produce markets are flashed backwards and forwards between New York and London in an almost imperceptible period of time. The brokers in those two cities, as well as at Paris, Antwerp, Amsterdam, Hamburg and other leading cities in Europe, who have business connections with New York are virtually brought into communication with each other through the business hours, allowing for the difference of time between the two hemispheres, and deal with each other almost in the same way as if they were face to face on the floors of their respective exchanges. The Atlantic cable service of the Western Union Telegraph Company is made the more comprehensive by that company's arrangements with the Anglo-American Telegraph Company, which owns three cables between Newfoundland and Ireland, thence by direct wire to London and several of the larger cities in Great Britain, one of these cables extending directly to Emden in Germany, where exclusive connection is made with the telegraph lines of the German government; also one cable from Duxbury, Massachusetts, *via* St. Pierre, Miquelon, to Brest, France, where a direct wire connects it with Paris; also by its connection with the Direct United States Cable Company, which owns a cable from Rye Beach, N. H., *via* Halifax, Nova Scotia, to Ireland, thence by direct wires to London. The Western Union Telegraph Company also operates the only cables between Florida and Havana, which belong to the International Ocean Telegraph Company. They connect there with the entire system of cables which extend to all the West India Islands, Venezuela, and the Northeastern coast of South America. It also has the only connection at Galveston, Texas, with the cables of the Mexican Telegraph Company and the Central and South American Telegraph Company, which extend, *via* Mexico, to Peru and Chili, and *via* a land line over the Andes Mountains to Buenos Ayres, Argentine Republic. It is, therefore, possible to send a message by the Western Union Telegraph Company's lines from the remotest telegraph office in the country to any part of the world, and to be sure of the promptest transmission, because of the numerous routes which the company controls.
—*From the Sun's Guide to New York.*



THE PHILADELPHIA TROLLEY.

The Philadelphia Trolley.

The Philadelphia trolley has been designed to fill the need of the electric railway superintendent and engineer. It embodies simplicity, being made up of only nine parts. It can be dismantled in seven seconds and assembled in 22 seconds, all without a wrench. Not one nut, bolt, screw or washer is in its construction. There are no chains, coil springs or small parts to rust, or break with cold, ice or snow. No oil or grease is required.

The Philadelphia trolley embodies substantial mechanical design with lightness and durability of parts. All parts are interlocking and interchangeable, which means minimum cost of maintenance and repairs. It has side motion, besides being pivoted and free to turn. The design of the cam against the leaf spring gives it equal tension against the trolley wire from vertical to horizontal positions. The degree of tension may be adjusted through a wide range. The sole manufacturers of this device are the Technic Electrical Works, Provident Building, Philadelphia. Agencies for this trolley will be placed in all parts of the United States and Canada.

Lo, The Poor Car Horse.

What will become of the hundreds of horses of the Brooklyn City Railroad Company and other surface roads when the trolley is generally introduced? This question was asked by a reporter of the Brooklyn *Eagle* of one of the superintendents of the Brooklyn city's stables.

"Auction 'em," was the reply. "Auction 'em at any price. Usually, when we sell horses, we sell them at private sale, but there will be so many that this plan will not do."

"What class of animals are they?"

"Very good, that is, those that have only been on the road a few years. The average life of a car horse is six years. Some don't last as long, while others are useful after ten years of service. This company pays all the way from $140 to $225 apiece for its horses, which must be perfectly sound. Some firms make a business of supplying car companies and are always buying large numbers of medium sized animals. Light horses, those between 1,000 and 1,200 pounds, are adapted for the purpose."

When the horse auction occurs the city will be filled with farmers from Long Island and all over the State. The car horse, even after it has ceased to be of service in the dragging of a car, is useful on a farm. When discarded by the car companies it is in fairly good condition physically. It has been well fed and cared for, and while the work it has done has had a tendency to break it down, it makes a good plow horse and can often be used for carriage purposes. At private sale the animals discarded by the car companies bring from $20 to $50 according to value and "action." It is thought the auction prices will be much less. At a rough estimate, there will be nearly 4,000 horses to be disposed of. Already nearby Long Island farmers are speculating on securing good, serviceable animals for a song.

MEDICAL ELECTRICITY.

EDITED BY DR. J. MOUNT BLEYER, NEW YORK.

Transactions of the American Electro-Therapeutic Association.

AT THEIR SECOND ANNUAL MEETING, HELD IN NEW YORK, OCTOBER 4, 5 AND 6, 1892.

FIRST DAY, OCTOBER 4, MORNING SESSION.

The Association was called to order by the president, who then delivered his address on "Electricity, and Medical Art and Science." Seldom, he said, had a branch of science requiring so much intelligence been so sedulously relegated to those least gifted to pursue its study. Among the causes of this might be mentioned, the difficulty of comprehending the nature of electricity, traditional adherence to drugs in the treatment of disease, and skepticism as to the value of other therapeutic measures, a natural contempt for the ignorant methods pursued by the charlatans who were among the first to make much use of this agent in medicine, and the ignorance of the public who regard electricity as a great "cure all." At present, the electrical engineers are beginning to invade the realm of biology, and, what is more important, medical men are turning their attention to the physics of electricity. We build our faith upon the known and remarkable action of this agent upon living tissues, viz: The excitation of living protoplasm; electrolysis, without which, there would be no conduction; cataphoresis, by which the fluids of the human body are moved by the flow of the current from the positive to the negative pole; and the vaso-motor effects. Electrolysis, chemically, and cataphoresis, mechanically, alter the amount and distribution of the salts necessary to the proper nutrition and function of the various parts of the living organism. Electrical action in the human body becomes a chemical process, and as it is there confronted with the ordinary chemical processes of the living organism, it may be said that electro-therapeutics is chemistry against chemistry.

The next in order was the report of the committee on standard coils. This committee had been unable, as yet, to formulate a report, but the members, Drs. Morton, Goelet, Hutchinson and Massey, expressed their individual opinions on this subject.

Dr. Goelet, of New York, had found the manufacturers, with the exception of the Chloride of Silver Dry Cell Company and the Galvano-Faradic Company, rather reluctant, on account of the great expense incurred, to construct the long fine wire coils which he desired, but he had experimented personally enough to note that the suggestions made in his paper, read at the last meeting, were in the right direction.

Dr. Hutchinson thought the committee should report progress, and be continued for another year. It was very desirable to have a definite coil, of a definite resistance; then there would be some means of comparing the results obtained by various observers.

Dr. Massey had devoted his attention chiefly to a consideration of the powers of the primary faradic current to contract muscle, and, in doing so, had noted great differences in this respect in the four Du Bois-Reymond coils in his possession; differences which he attributed to variations in length of the primary wire, in the length and mass of the core, and in the character of the current interruptions.

Dr. Morton said that in view of the fact that induction coils may be made varying in the number of interruptions from 20 per second to 20,000 per second, and that, so far as known, the latter had no effect on the human system, some idea might be obtained of the difficulties encountered by the committee. He suggested that an electrical expert be added to the committee, and mentioned the name of Mr. A. E. Kennelly. By a unanimous vote, this gentleman was accordingly added to this committee.

"The Use and Abuse of Electricity in Medicine."

A paper on the above subject was read by Dr. A. D. Rockwell, of New York.

The author referred to a newspaper report of a fatal case of opium poisoning, in which four physicians attempted unsuccessfully to use an antiquated electrical apparatus which they had resurrected from a neighboring drug store, and commented upon the fact that physicians were too apt to be poorly provided with the needful electrical apparatus in a state of good repair. As in such cases, artificial respiration may be kept up for hours at a time, it was not at all improbable that this patient's life might have been saved had the proper appliances been at hand. As an example of the necessity for special training for the practice of electro-therapeutics, as for all other special departments in medicine, he contrasted the treatment of two cases of infantile paralysis. In one, there was but little muscular contractility remaining when the case first came for treatment. He subjected the muscles to prolonged and powerful faradization, with the result of entirely extinguishing the little muscular irritability which had been present. The second case was treated patiently and skilfully with the *continuous* current, with the result of gradually but markedly increasing the power of the muscles. As an instance of the recuperative effect of electricity when intelligently applied, the author then exhibited a patient who, as a result of a railroad accident, had sustained some injury of the radial, median and ulnar nerves. For three months before coming to this physician, the faradic current had been applied at a series of long sittings. When first seen, in May last, there was such profound atrophy and loss of muscular irritability, associated with degenerative reactions, that an unfavorable prognosis was given. At present, however, he is so much improved that he is able to attend to his duties as a mover of baggage. In such a case energy is undoubtedly stored up somewhat as chemical action is stored up in storage batteries. Very few physicians understand the widely different effects to be obtained from the static, galvanic and faradic forms of electricity, and a still smaller number is aware of the great differences existing in the faradic coils themselves. Electricity is a many sided weapon, and on account of its seemingly paradoxical claims, it often excites prejudice. The electrical engineer must be an "expert," but the physician who uses electricity may know little or nothing about it.

Dr. R. J. Nunn, of Savannah, said that the allusion to the case of opium poisoning made him rise in defense of the country practitioners, who are the bone and sinew of the profession. It is absolutely impossible for those working in sparsely settled districts to have at hand all these appliances, and it is not so much their fault as it is their surroundings. Nothing had been said about the intolerance of some patients to electricity. He had sent to the president a patient in whom the current of electricity, so feeble that he could not feel it, was sufficient to set up an albuminuria. This occurred with the galvanic, faradic or static current; it could also be produced by any nervous excitement, such as a long walk, business cares, or by indigestion.

The president said that, on the whole, this so-called "intolerance" of this patient was rather complimentary to electricity, for we are all on the look-out for objective signs of the effect of electricity on the human body. In this case, within three or four hours after the treatment, there would be a marked albuminuria.

New Contributions of the Electrical Treatment, Both Faradic and Galvanic, to the Diagnosis in Gynæcology.

Dr. George Apostoli sent a communication on this subject, which was read by Dr. Hutchinson. The auther said that his observations with the faradic and galvanic current had led him to look upon them as useful aids in diagnosis, and he thought exploratory laparotomies and mutilating operations for ovarian disease should be proscribed until we had learned all that was possible from such intra-uterine applications of electricity. In 1883 he had shown the marvellous sedative action of the current from a fine wire faradic coil, and further experience had taught him that every hysterical pain of ovarian origin is amenable to this current, and that, therefore, if this current fails to give relief, there is a concomitant affection of the appendages. While employing the galvanic current in the treatment of fibroids, peri-uterine inflammations, dysmenorrhœa, menorrhagia, etc., he had been struck by the variable tolerance of the different subjects to the galvanic current, and the variations of this tolerance in the same uterus at different times. These variations were found to be due to various physiological and pathological conditions. Thus, in many cases which he had failed to relieve by this current, after the excessive uterine sensibility had been controlled by castration, the electrical treatment could be resumed without special discomfort to the patient and with positive benefit. In our treatment we must note, (1) the operative reaction or tolerance to the current, and (2) the post-operative reaction. The latter is the more important and may last for several days. In a case which is free from inflammatory adhesions of the appendages, and in which the galvanic current of 50 to 100 milliamperes is employed carefully, and with every antiseptic precaution, it is never followed by a febrile or a very painful reaction; therefore, the more the woman complains during the operation out of proportion to the strength of the current, and the more quickly the pain ceases after the treatment, the more precise is the diagnosis of hysteria. On the contrary, in every case of peri-uterine phlegmasia there is but little tolerance to the current, the post-operative reaction begins quickly, and is prolonged in proportion to the acuteness of the inflammation of the appendages. It may be stated positively that every pelvic suppuration predisposes to intense galvanic post-operative reaction.

Every galvanic application should be begun with the positive pole in the uterus, and the current at the commencement should not exceed 50 milliamperes; the application should be interrupted as soon as there is manifest intolerance to the current, and should not be resumed until all post-operative reaction has subsided. If, notwithstanding these precautions, the galvanic treatment is not tolerated, it indicates that there is some inflammatory condition present. Such treatment is not dangerous if the rules laid down are carefully followed, particularly as regards the use of the positive pole at the beginning, and the avoidance of too strong a current. Every uncomplicated ovarian cyst will tolerate high intensities of current applied intra-uterine, and there is no post operative reaction. Hence, we may conclude that the proper application of the galvanic current to the interior of the uterus informs us as to the condition of the appendages, the degree of inflammation and whether or not there is pus present. It enables us to avoid mistaking a subperitoneal fibroid tumor for a salpingitis, and *vice versa*. Even if there be a co-existent ovarian cyst without inflammation, the same tolerance will be observed. If with a current of only 20 or 30 milliamperes, the intolerance is excessive, it indicates that the uterus is attacked by a lesion not amenable to conservative gynæcology, and that galvanic treatment must be suspended. Castration will then probably be required.

(To be continued.)

Lessons Learned from the First Convention of Electro-Therapeutists.

The first convention of the American Electro-Therapeutic Association is now a thing of the past, but the seeds that were planted at that grand gathering must take root and flower in the future.

Only a year old, the interest shown in the proceedings not only by the members of the Association, but the profession at large, demonstrates beyond peradventure that electro-therapeusis has become an established special branch of medicine.

It has come to stay and its *future is before it;* growth and development must be rapid. Less than a decade ago the electric current was but an interesting mystery to doctors. In some instances where it was applied it was productive of happy results, but none could explain its workings in the human organization and only a few dared to call its power into play.

To-day the current has been bridled, and a more docile and reliable agent is not to be found in the category of therapeutics. It would have done the heart of the skeptics good, for there are many unbelievers in our profession, to listen to those carefully worked out essays upon the medical value of amperes, ohms and volts. To hear the thoughtful men, who for years have been developing this new field, express positive opinions that the current in its various forms can be meted out in doses just as any other remedy in the pharmacœpia was the fine archery for electro-therapeutics.

The results of these observers have inspired confidence, and it is only the question of a short time when electricity will become a curative agent in every branch of our science. Electro-therapeusis has come to stay. —BLEYER.

Electricity in the Treatment of Endometritis.

We regret to say that there is still among us practitioners of the fast advancing and improving methods of treatment, a gynæcologist of fair name and high repute, who has voluntarily fettered himself to ideas that were not new 20 years ago, and who refuses to go ahead with scientific research. This gentleman is a well known professor, who, at a recent assembly of gynæcologists, without any cause or provocation, delivered himself of this remark: "The use of electricity in the treatment of endometritis is a waste of the physician's time and the patient's money."

We are glad, doctor, that you hold this opinion. It will ever be yours, and yours alone, and you will have few aspirants to share it with you. Come apart, dear doctor, and commune with us. Do you recall the odd, yet trite, saying of the Greeks: "Men are tortured with the opinions they have of things and not the things themselves."

It would be a great victory for science, and many honest experimenters and searchers after new truths would stop short with tasks accomplished, were there a single peg in science upon which to hang your opinion.

We can see nothing in your erudite paper to justify your opinion. It looks more like an overflow of bile than a fair measure of unbiased logic. In the parlance of the pavement, you have made "a bad break."

Your knowledge of electricity and electro-therapeusis can well stand a bit of furbishing; however, that is entirely a matter for you to decide. But when it comes to commanding the profession to accept such an opinion, in which suffering humanity is interested, we feel it our duty to call a halt.

Electricity thoroughly understood and intelligently applied, you will admit, is a wonderful therapeutic agent, a remedy of incalculable value, for many disorders and, perhaps, for endometritis, too. Your long and varied experience ought to have taught you better, and, in a word, dear doctor, you are behind the age. Nowadays it means either brush up and lead or you will lose the race. —BLEYER.

Dr. Schavoir Dines a Few of the Members of the American Electro-Therapeutic Association at His Sanitarium, Stamford, Conn.

The train left promptly at 11 A. M. On the arrival of his guests carriages met the entire party at the station. They were driven to the sanitarium, which is the best equipped for the treatment of diseases by electricity in the State of Connecticut. The dinner was served *a la Royal*. Amongst his guests was Dr. Goelet, Dr. Nunn, Dr. Dickson, Dr. Mount Bleyer and Mr. Schoonmacher.

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New York & Ohio Co	xvi
New York Belting and Packing Co	xiv
New York Insulated Wire Co	xvi
Okonite Co	ix
Onondaga Dynamo Co	vi
Ostrander & Co., W. R	xv
Penn Life Co	xii
Pennsylvania Electric Engineering Co	x
Phœnix Glass Co	xiv
Phosphor Bronze Smelting Co	xii
Pickert, A. T	108
Pope Mfg. Co	xii
Prentiss Tool & Supply Co	108
Queen & Co	108
Reed & Co., F. E	xiii
Railway Equipment Co	xii
Rhode Island Tool Co	viii
Ries Electric Specialty Co	xvi
Ridlon & Co., Frank	108
Rosenbaum, Wm. A	xii
Royce & Marean	xv
Russell & Co	xiii
Samson Cordage Works	x
Sawyer-Man Electric Co	xiv
Shawmut Fuse Wire Co	xiii
Shipman Engine Co	viii
Solar Carbon & Mfg. Co	viii
Standard Paint Co	108
Standard Railway Supply Co	108
Stanley Electric Mfg. Co	xi
Stocking, E. B	xii
Swan & Lane	x ii
Transport	viii
Tyndall, Wm. D	xii
Waddell-Entz Electric Co	xv
Walworth Mfg. Co	iii
Washburn & Moen Mfg. Co	xii
Watson & Stillman	xiii
Western Electric Co	xvi
Westinghouse Electric & Mfg. Co	vi
Wheeler Condenser & Eng. Co	xiii
Willard & Co., C. P	108
Willson, H. B	xii
Wood, John, Jr	xi

The immense factories of the electrical manufacturing companies of the United States are crowded with work as they never have been before. As proof of this we cite the fact that some half dozen of the largest size of Thomson-Houston generators have been completed by the Armington & Sims Engine Company, at Providence, the large factories of the former company, at Lynn and Schenectady, being driven to their utmost capacity. This is a new departure for an engine company, but as only the heavy work of building the dynamo was undertaken, the armatures being made by the electrical factories, it can easily be understood how a great establishment like Armington & Sims could acceptably handle the work. This company also reports the month of September as being the best business month since it has been in business, and the great bulk of its engines are for electric light and electric power stations. Truly the electrical business has assumed gigantic proportions.

The annual meeting of the American Street Railway Association occurs at Cleveland this week. It is probable that the trolley will dominate this gathering, as it is getting in the way of doing nowadays.

Among our notes on the Edison incandescent lamp decision last week was one in which we stated that "the *Electrical Engineer* appeared on time with no mention of any of the decisions, but followed up the matter a day later with a supplement giving synopses of the three decisions." Our esteemed contemporary informs us that it reported the Edison decision in full in its supplement, and made synopses of the other two decisions. We are glad to make this correction.

The three quarter mark of the present year has been reached, and what an interesting nine months it has been. In the first place, it is a presidential year, and it is an axiom among business men that such years always witness poor business. Then we had the cholera scare and last week the Edison, Brush-Swan, and Brush storage battery decisions. Now comes the Columbus celebration, with its distracting tendencies. If we have not been sufficiently stirred up in 1892 to deserve a splendid business year in 1893, the court doesn't know himself.

The passing of the street car horse is a gratifying reality in all the progressive cities of this continent. In Toronto the electric cars were recently inaugurated, and next day 500 car horses were parted with at prices ranging from $10 to $60. The Union Railroad Company, who recently installed the trolley in the annexed district of New York, has sold 325 horses at an average price of about $30 each. This company is now using 20 trolley cars and is accomplishing more work with them than it formerly did with 42 horse cars, besides cutting 20 minutes off the trip from Harlem Bridge to Fordham. For every trolley car installed, from two to four horses are set free from galling bondage. The ethics of the trolley are comprehensive.

The reports that the Western Union Telegraph Company has completed negotiations for the transfer and control of the Postal Telegraph Cable Company are still in existence, despite the denials of Mr. Jay Gould and his friends. The ELECTRICAL REVIEW is in possession of information which leads us to believe that the negotiations for the absorption of the Postal Company are nearly completed, and it is generally understood that the sale has been agreed upon. The combination of these great corporations will give the Western Union a mighty influence, and, as the annual report of that company, printed on another page, shows a steady reduction in the price of telegraphing from year to year, it will probably result in a still further reduction of tolls.

On Tuesday of this week an event occurred which forms a fitting subject for a paper in the "Historic Moment" series, which has been so ably handled in *Scribner's Magazine.* As this issue of the ELECTRICAL REVIEW goes to the printer, the press opening of the American Telephone and Telegraph Company's long distance telephone lines between New York and Chicago is held at the local exchange in Cortlandt street. The transmission of the human voice over a distance of 1,000 miles is certainly an event of historic interest, second only to that famous moment when the message, "What hath God wrought," was pulsated along a wire by Morse's telegraph instrument. The completion of this long distance telephone line in time to be used in connection with the World's Fair dedication ceremonies marks the performance as one of the ablest telephone engineering feats of the electric age. It is hoped that the engineers and designers who have so skillfully performed their task will be accorded the credit they deserve. The next issue of the ELECTRICAL REVIEW will contain a description of the opening of this line.

LETTERS FROM A LABORATORY.—XVII.

BY JULIAN A. MOSES.

In one of my previous letters I have referred to a method for keeping duplicates in plaster of any piece of intricate or expensive machinery which is in process of manufacture, so that any part, no matter how important, can be replaced at a moment's notice by simply referring to the model. This method is not perfect; but it seems to me the fault is only in the material used, for it is somewhat difficult to keep brittle plaster casts free from chips, breaks or scratches. It is easy to find flaws in methods that are not perfect, but it is quite difficult to repair them. I have found a material to remedy this defect which I propose to substitute for plaster, as it is almost impossible to make and keep plaster castings of delicate and slender articles. The substance is vulcanized rubber, and will prove of great use in the laboratory, for the following reasons: It is water-proof, unaffected by the stronger acids, an excellent non-conductor, both of heat and electricity, easily turned, filed and manipulated in the cold at the workbench, and in every way it accommodates itself to the needs of a laboratory mechanic. Rubber for vulcanizing is a compound containing sulphur and rubber, and can be made by dissolving virgin rubber in a solution of chloride of sulphur in bisulphide of carbon. By evaporating the mixture until all the free solvent has disappeared, and afterwards boiling it in a solution of caustic potash, the mass becomes of a pasty consistency, which gradually hardens on exposure to air. In order that this hardening shall not occur, the rubber, as now prepared for vulcanizing, is manufactured in sheets and kept between glazed cloths, which prevent evaporation and consequent sticking together of the adhesive sheets.

Like plaster, it can be moulded to any required form, but it has this advantage, for while plaster is extremely brittle, and will not withstand the rough usage of a shop, vulcanized or hard rubber, as it is sometimes called, is one of the most durable substances.

By keeping this compound at a temperature of about 320 degrees Fahrenheit for an hour or so it changes its condition and becomes a black, hard, tough and elastic material, which may be used in many ways as a means of making many complicated and accurate patterns which would otherwise give the experimenter considerable trouble were they to be made of wood, brass, or any of the many materials which must be worked cold in a solid form.

Vulcanized rubber may be of different degrees of hardness, from the soft kind, which is filled with finely ground and washed sea sand, used for pencil erasers, tubing, etc., to the hardest kind, such as is used in plates for false teeth. This hardness may be controlled by the quantity of sulphur in the composition. A very soft rubber will contain about five per cent., and from here the amount may be increased until the rubber refuses to combine with any more. Too much sulphur will make the product so brittle that it is of no practical use; a happy medium is now obtained by the dealers in rubber for vulcanizing, in which the resulting product possesses the qualities before ascribed. But a workman may have perfect materials and yet not obtain good results. So, with the compounds now in the market at your disposal (for it is inexpedient to make the preparation for yourself), I shall tell you how to manipulate rubber so as to obtain the best results.

The precautions and pieces of advice which will follow are the result of many years of working in vulcanized rubber, and if carefully observed will save the experimenter many failures and trials, should he attempt to work in this material.

The electrical fraternity have taken kindly to hard rubber, for it has served them well, where other materials refused to accommodate themselves to the exigencies of the case. Many instruments have been made which would now be in embryo, where it not for this compound; but all of its uses are not yet known, its applications are numerous, and its value considerable.

The materials for the working of this substance are neither many nor expensive. A good vulcanizer, one or two presses to hold the mold while the process of vulcanizing is in operation, a gas stove or burner to furnish the heat, a quantity of rubber with which to make your patterns, etc., and a generous supply of plaster, will be all that is necessary to make any number of the most difficult patterns, handles, jigs, or any of the many articles which can be molded in plaster.

CORRESPONDENCE.

OUR CHICAGO LETTER.

The Enterprise Electric Company, Chicago, report large sales of wire, among which was one sale of 175,000 pounds in St. Louis.

Mr. Walter C. McKinlock, of the Enterprise Electric Company, has just returned from New York, where he spent the past two weeks on a vacation.

The Central Electric Company have taken the agency for the machines for painting mouldings manufactured by the Standard Paint Company, New York.

Mr. S. A. Douglas, who has been connected with the home office of the Brush Electric Company, has been appointed manager of the Chicago office, to succeed Mr. Alexander Kempt, who has resigned.

Mr. M. B. Austin, who has been with the Western Electric Company in Chicago for some years, severed his connection with that Company and has accepted a position with the Knapp Electrical Works, of Chicago.

The Buckeye Electric Company, 437 "The Rookery," Chicago, report that the trade are taking to Buckeye incandescent lamps. It is evidenced by the fact that the company are producing 2,000 lamps daily, yet are unable to keep up with the demand.

The Electric Appliance Company, Chicago, have received a large consignment of security cleats, and they are selling a great many. The security cleat and security insulator are late specialties in the direction of high grade electrical construction and are proving very popular.

The Pennsylvania Railroad Company is about to light its yards at Fourteenth street by arc lamps, and has placed a large order with Geo. Cutter for Simplex wire to be used in the installation. Geo. Cutter reports that he is receiving large consignments of improved Schaefer lamps to keep up with the demand.

A New Supply Company has been organized in Chicago, the Taylor, Goodhue & Ames Company, with offices at 827 Monadnock building, with Wm. Taylor, as president; Wells Goodhue, as vice-president; and H. D. Ames, secretary and treasurer. These gentlemen are well known in the electrical field, Mr. Taylor having been assistant manager of the Electrical Supply Company, in Chicago, for seven years; Messrs. Goodhue and Ames also served in the same company. The new company will carry a list of important specialties. They have been appointed selling agents for the Columbia lamp and will carry a complete stock. They will also manufacture leading articles of their own and handle materials for electric light and electric railway plants. The company starts out with good financial backing. It comes into the field as a first-class supply house with facilities for filling orders of every size promptly.

The Ahearn Electric Heater is attracting a great deal of attention at this time, and the manufacturers are fortunate in being able to give facts and figures of actual results obtained by the use of this practical and efficient heater. The electrical interests are to be congratulated in the fact of Mr. Ahearn giving his time and attention to this branch of the business. He is not only a thoroughly practical electrician, but he has had severe conditions to contend with in the cold climate of Canada. He has certainly patented an electric heater that will heat, and that will give no trouble in operation. Samples of the heaters will be shown in operation at the Street Railway Convention at Cleveland, by the sole manufacturers and selling agents, the Railway Equipment Company, Chicago. The latter company has given more time and attention to electric heating than any other company or individual, and they are pleased to state that they now have a heater which they can not only recommend, but guarantee.

Chicago, October 15. M. J. B.

OUR SAN FRANCISCO LETTER.

Geo. P. Low, electrical expert for the Pacific Insurance Union, has returned from a three months' business trip North.

The Telegraph Avenue electric road in Oakland is fast nearing completion. It is claimed by many to be the best constructed electric road in the State.

At the Last Regular Meeting of the California Electrical Society, September 19, Max Caspari read a very interesting and highly instructive paper upon the subject of "Transformers."

The San Jose and Santa Clara Electric Railroad Company has applied for a 25-year franchise to construct and operate a system of electric motor power to be supplied to San Jose consumers.

The Nevada County Electric Power Company has been incorporated with a capital stock of $500,000. The company has commenced work on its dam located on the South Yuba river, about a mile from the Purdon Bridge. From this place the water will be carried down the canyon four miles to a point where a fall of 400 feet may be had. Here the plant will be located and the wires strung over the hills to Nevada City and Grass Valley, a distance of three and three quarter miles from the former town and seven miles from the latter.

The Writer has just returned from an extended trip through the States of the Pacific Northwest, as well as the territory of Alaska. The old story again repeats itself; the horse has succumbed to the inevitable, while the much mooted trolley reigns supreme. Nearly all the principal cities of Oregon and Washington were visited, and everywhere like results were noted. There was hardly a city, notwithstanding its size, where the inhabitants were not awake to the advantages of rapid transit as afforded by the subtle fluid. Tacoma, Seattle and Portland have shown usual activity in this line, many roads now being in the course of construction while numerous others are contemplated. The writer went over the same ground a year ago, and in this short space of time the growth has been truly phenomenal. These facts are especially noticeable owing to the dull times that have prevailed on the coast for the past year. Electric road building on the Pacific Coast has become as epidemic as the cholera in Russia.

Another City has stepped into line. Alameda, situated across the bay from San Francisco, will soon have an electric railway, work having already commenced. Progressive citizens of Alameda, as before noted in these columns, have been handicapped in their endeavors to secure a rapid means of transit between their city and Oakland, owing to the deplorable fact that one individual, Theodor Meetz, held, and has held for years, all the principal street railway franchises, the only use he has made of them being the maintainance of a one-horse car line between that city and Oakland, greatly to the annoyance of the public. But this could not endure forever. The people demanded an electric road, and so forcible became their demands that Meetz was glad of an opportunity to sell his franchises and road to a company who at once commenced the construction of an electric road. This company applied for additional franchises, which were granted, and by the first of the year it is expected that Alameda will have one of the best constructed electric street railway systems on the Pacific Coast.

San Francisco, Oct. 10. J. R. K.

OUR SEATTLE LETTER.

The Various Cable and Electric street railway companies of this city have united in a petition to the city council for an extension of their franchises for 25 years, the franchises now having an average of 20 years yet to run. They offer in return for this concession to pay to the city a percentage of their earnings, beginning 10 years from the present time. For the first five years they offer to pay 1 per cent., estimated to amount to $100 a day; for the next five years 1½ per cent., estimated to produce $237.50 per day; and for the remaining 15 years 2 per cent., estimated to produce $400 a day. As a reason for making this offer the companies state that, owing to the terms of their present franchises, they have been able to sell only a part of their bonds, and that in consequence a large amount of capital is locked up which might under better conditions be released for other investment in the city. As proof of the truth of this statement, they submit the following table:

Name.	Bonds.	Sold.	Held.
Front St. Cable	$300,000	$300,000	.....
Madison St. Cable	450,000	.....	$450,000
Green Lake	50,000	.....	50,000
Rainier Electric	200,000	.....	200,000
Union Trunk	350,000	16,000	334,000
Rainier R. & P. Co.	500,000	.....	500,000
Seattle City Ry	1,000,000	449,000	451,000
Seattle Electric Ry.	1,000,000	381,000	619,000
West St. & N. End	300,000	.....	300,000
Grant St. Electric	125,000	.....	125,000
Woodland Park	50,000	.....	50,000
*North Seattle	100,000	.....	100,000
*South Seattle	100,000	.....	100,000
Total	.....	$1,146,000	$3,279,000
			1,146,000
			$2,133,000

*Not bonded, but the amounts shown are about what these lines could be bonded for with favorable franchises.

Seattle, Wash., Oct. 5. L. K. H.

The General Electric Company's Float "Electra."

The Columbus celebration was the only thing that really happened in New York last week. The day parade on Wednesday was witnessed by 2,000,000 people on the streets, stands and housetops, and by 50 persons from the windows of the ELECTRICAL REVIEW offices. It was a great success, the military pageant being truly imposing.

GENERAL ELECTRIC COMPANY'S FLOAT "ELECTRA" IN COLUMBUS NIGHT PAGEANT.

The night parade on Wednesday was a distinct failure, the only redeeming features being the electrical effects on the historical floats. The best float was the "Electra," fitted up by the General Electric Company. It was equipped with 3,000 incandescent lamps, and a couple of tons of storage batteries made by the Union Electric Company, of this city. These batteries gave 100 amperes at 85 volts for three and a half hours. The electrical effects on the other floats were mainly produced by 100 candle-power and 75 candle-power incandescent lamps provided with reflectors. The general appearance of the "Electra" is shown in the illustration on this page.

Annual Meeting of the Western Union Telegraph Company.

The stockholders of the Western Union Telegraph Company, representing about 500,000 shares of stock, held their annual meeting on October 12. The two vacancies in the board of directors caused by the death of Messrs. Cyrus W. Field and Sidney Dillon were filled by the election of Messrs. Henry B. Hyde and G. Murray Crane. There were no other changes in the board. The meeting adjourned after hearing the annual report.

The following balance sheet is the auditor's statement of the assets and liabilities of the company:

ASSETS.	
Telegraph lines; stocks owned of leased telegraph companies that are merged in Western Union Company's system; franchises, patents, etc.	$97,653,208
Stocks and bonds of leased telegraph companies, received in exchange for collateral trust bonds	8,234,500
Stocks of not leased telegraph and telephone companies and other securities	7,627,559
Real estate	3,313,918
Supplies and material in supply departments	252,722
Sundry accounts receivable, etc.	2,088,599
Cash in treasury and in hands of agents (since remitted to treasury)	2,202,275
Sinking funds for redemption of bonds	388,030
Total	$121,760,806
LIABILITIES.	
Capital stock	$86,199,852
Funded debt	15,198,060
Gold and Stock Telegraph Company, for stocks of other companies, held through lease of that company until 1981	2,264,900
Sundry accounts payable, etc. (including dividend payable July 15, 1891)	2,994,383
Surplus of income prior to Oct. 1, 1881, appropriated for construction and acquisition of telegraph lines and property (in excess of the $15,526,590 capital stock distributed in 1881, on account of such appropriations of income during the 15 years preceding)	1,298,184
Surplus of income subsequent to Oct. 1, 1881 ($10,787,981.31), plus the portion of surplus of income prior to Oct. 1, 1881 ($829,759.91), that was not appropriated as above	13,576,127
Total	$121,760,806

President Green's annual report, which is for the year ended June 30, 1892, contains the following information:

"In a business, more than half the cost of conducting which is in salaries and wages, and that at more than double the rate paid for like service on the other side of the Atlantic, it is remarkable that while their telegraph systems are showing deficits this company is enabled to exhibit fair profits at rates for service to the public approximately the same for distances of 500 miles and under, and very much lower for longer distances, than those charged by any two or more combined systems of the Old World.

"The earnings for the transmission of messages of all classes were $22,045,425, as against $20,704,270.54 the previous year; and, deducting the earnings for service over the Atlantic and Gulf cables, the revenue derived for service over the land lines in the United States and maritime provinces was $19,693,820.52, being an increase of $418,300.64 over that for the same class of service the previous year. The expenses pertaining to the maintenance and operation of the land lines employed in the transmission of messages were $13,898,265.78, being an increase for that class of service of $145,262.61 over those of the previous year.

"The average tolls collected were 31.6 cents per message, as against 32.5 the previous year, and the average cost of the service was 22.3 cents per message, as against 23.2 the previous year, showing a reduction of nine mills per message in the tolls collected, and precisely the same reduction in the cost of the service.

"The average rate of tolls has been reduced to less than one-third the rates charged the public in 1868, and the average rate of tolls now collected from the public is less than one-half of the average cost of the service twenty-four years ago.

"There have been added to the plant during the year 1,595 miles of new and additional poles, 23,514 miles of new and additional wire, and 602 additional offices, which have been paid for out of earnings and charged to construction and new property account. All reconstructions, renewals of wires and cables (though a line of poles capable of carrying 12 wires may be replaced by a line capable of carrying 24 wires) are charged to current expenses before profits are brought down. Nothing is charged to construction and new property except what is absolutely new and additional. No expenditures for renewals of old properties enter into this account. Instead, therefore, of having anything to charge off for depreciation of property, the telegraph properties of the company are being improved every year in value, strength and capacity for business out of the current working expenses.

"By order of the Board of Directors, a meeting of the stockholders has been called for Oct. 25, instant, to vote on the question of authorizing an increase of $13,800,000 in the capital stock of the company, making the aggregate capital stock $100,000,000.

"The charter of the company stipulates that 'the lines shall be extended from the sale of capital stock, and not otherwise,' and the law does not permit the sale of capital stock at less than its par value. The only method, therefore, of compliance with both the charter of the company and the general statutes, is to expend a portion of the net earnings, which belong to the stockholders, in the extension of the lines and additions of wires and other telegraph properties, and give the shareholders *pro rata* capital stock for such expenditure at par.

"No definite disposition of the proposed increase of capital stock has been determined upon. If authority be given to make the increase, the new Board of Directors, elected at the annual meeting, will in due time determine on such disposition of the increased capital as shall be for the best interests of the company, and equally fair and just to all the shareholders."

Shops of the E. W. Bliss Company, Limited.

One of the best known manufacturers of heavy tools and machines in this country is the E. W. Bliss Company, Limited, of Brooklyn, N. Y.

The company under its present name is the consolidation of the E. W. Bliss Company and the Stiles & Parker Press Company, of Middletown, Conn. A rapidly growing trade, and particularly in view of the demands for space made upon them by the removal of the Stiles & Parker Press Company's business from Middletown to Brooklyn, has made increased manufacturing facilities a necessity. In addition to this, the E. W. Bliss Company, Limited, have very important government contracts in the construction of Whitehead torpedoes, and to arrange for this new division of their business, providing proper facilities, a new building was also necessary. The company, accordingly, have recently completed a six-story building, occupying the balance of the block upon which are located their old shops. There is now a total frontage of nearly 200 feet on Adams street, while the buildings extend back on Plymouth street somewhat more than 200 feet. With the completion of this building and the addition of a considerable amount of new machinery, including an erecting shop, equipped with various modern appliances, the establishment at present stands, in its special line, second to none in the world. The shops are close to the river front, they are also in short walking distance of New York and Brooklyn Bridge, and are likewise easily accessible from the Fulton and Catharine street ferries. Although located in Brooklyn, which, in the estimation of some people unacquainted with New York, puts them a long distance away, they are far more accessible to business men visiting New York than the majority of the establisments which use New York as their business address and which, although inside the city limits, are along the river fronts in the upper wards or in the annexed district. As a fact, it requires less than fifteen minutes to get from the City Hall, New York, to the office of the works here illustrated, and it requires but a little more than this time to reach the works from Jersey City, making the trip by the Brooklyn annex to the slip alongside of Fulton Ferry.

The foundry department is two blocks removed from the main works. The ground plan of the foundry, as shown in Fig. 3, indicates that there is ample space for the large castings required in the heavy machinery for which this company are noted and of which they are at present making a leading specialty. The foundry is equipped with various labor-saving devices and all necessary conveniences, including cranes for removing castings, carrying flasks, pouring, etc. The location of cupolas, disposition of molding space, etc., are readily seen by the plan, and therefore do not require extensive description. The portion of the foundry building shown in the plan at the corner formed by Front and Pearl streets is several stories in height, the upper floors being in part used for storage by the company and in part rented out.

The view in the recently completed erecting shop of the company, which was made from a photograph taken a short time since, gives an excellent idea of the facilities employed in this part of the establishment. An electric traveling crane, clearly shown in the engraving, is the central feature in the erecting shop, and is something which in its use to date has given great satisfaction.

This is a three motor machine, with a span of 48 feet and longitudinal travel of 96 feet, capable of lifting and conveying pieces up to 25 tons. The machine is operated by a man carried in the box, which is suspended at the left hand corner of the bridge trusses. This man manipulates with three wheels, and each of the wheels controls one motor. They can be used simultaneously, so that the lifting, transverse and longitudinal movements may be in action at the same time. In consequence of this arrangement, he can pick up castings and machines at any point of the erecting shop and carry them to any other point with the greatest speed and accuracy. The crane was designed by the Morgan Engineering Company, Alliance, Ohio.

The large door shown at the right of the erecting shop leads through a passage to the yard, and through it wagons are backed in for shipping purposes. In this connection the crane already referred to becomes useful as an assistant in shipping. In the view several machines are shown in progress of erection on the floor, but what are there indicated are, for the most part, of comparatively small size.

On entering the establishment the visitor reaches the business office by a single flight of stairs from Adams street. The office is 25x85 feet in size, and is divided into two general divisions by the space allotted for the reception of visitors. From the corner of this space a special enclosure is set off by a low railing, and occupied by the treasurer and general manager. The front part of the office is devoted to the accounting, and is occupied by the bookkeepers of the establishment. The cashier's desk is also in this part. The rear portion is occupied by the salesmen, the purchasing agent, the correspondence clerks, typewriters, etc. From the center part of the office, and near the desk of the treasurer, a door opens into the stock room or sample room, in which is shown a full line of the standard machinery made by the company. From inside the railing near the department of accounting, and near the cashier's desk, is a door which leads to the fire-proof vault. This vault is large enough for the storage of the books and records of the establishment, and, as will be gained by the plans, is several stories in height, making it specially valuable in different departments for different classes of storage. For example, it opens into the drafting room on one of the floors above, and there is used to keep valuable drawings. Special patterns of small dimension can also be stored in it in the lower portions. In the fitting up of this office, which has recently been completed, great care has been given to various details. The desire has been to make it comfortable for all the employés, and at the same time have it so arranged as to facilitate business in all the various details. Excellent toilet accommodations are provided, also lockers for hats and coats, etc. The floor above the general office contains the private office of the president, E. W. Bliss, also the office of the general superintendent and engineer of the concern, Frank M. Leavitt. The fourth floor is the drafting room.

The sample room, or stock room, occupies the second floor of the new building already referred to, and extends from the erecting shop on the one side to the Adams street front on the other. Nothing short of very large space, however, is sufficient for a display of the extensive line of stock presses and machines which the company manufacture. Only staple goods are displayed here, for special machines are, as a rule, shipped as fast as made, and are recorded simply by the photographic system of the establishment, something, by the way, which is very complete. The visitor in being taken through this part of the establishment naturally stops to look down into the erecting shop, and while thus examining what is there in progress, standing near where the cab of the traveling crane is shown at the left in the photographic view of the erecting shop, he is afforded an excellent idea of the resources of the establishment in producing machinery, whether of standard patterns or to meet special requirements.

The floors in the new building above the one just described are of the same shape and size. One of these is devoted to the torpedo department of the establishment, already referred to, another is devoted to die making and assembling of small tools, another to the Hall automatic signals, which the company manufacture, and still another to storage. Communication between the different floors in the main building is by means of an elevator and iron stairway in a fire-proof shaft.

The office communicates at the rear with the shipping-room and this in turn, by means of a bridge across the yard, that separates the old and new buildings with the second floor or die room of the old building. The old building, so called by contrasting it with the new and not because it is by any means old in fact or condition, runs the whole length of the block along Pearl street, and is a substantial four-story structure, fully equipped throughout with machinery. The lower floor of this structure has the heavy machines, lathes, planers, drills, etc., while the second floor contains tools of a little lighter construction, including milling machines and the like. The third floor has still lighter tools, while the fourth, or upper floor, is devoted to storage of patterns.

The blacksmith shop is well equipped with all modern appliances and is fully abreast of the requirements of the establishment in the supply of the particular parts and forms for which it is maintained. There is room for storage of material between it and the stables, while the lower floor of the office building, which communicates with this department, is likewise used for the storage of bar iron and steel. The boiler room and the engine room adjacent, are, by the peculiar arrangement of buildings, very nearly central, thus conveying power with a minimum of loss, and yet are easily acces-

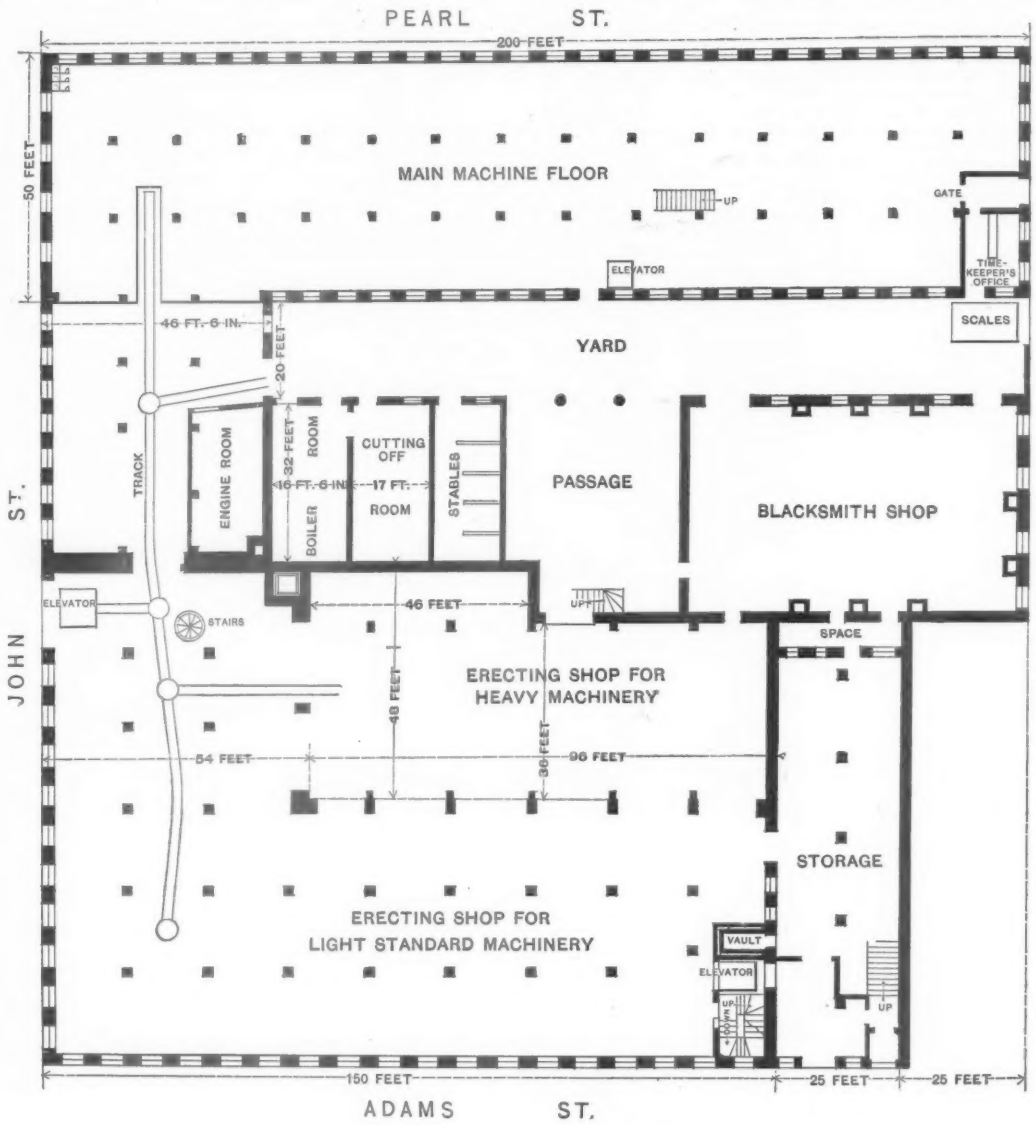


FIG. 1.—PLAN OF FIRST FLOOR OF MACHINE SHOPS, E. W. BLISS CO., LIMITED.

sible through the yard or court. Platform scales between the buildings facilitate the weighing of material received and goods shipped. Cranes and derricks are also available in this part for loading and unloading. The shipping department for goods that have to be packed, and also containing the shipping clerk's office, is conveniently located in the passageway, between the

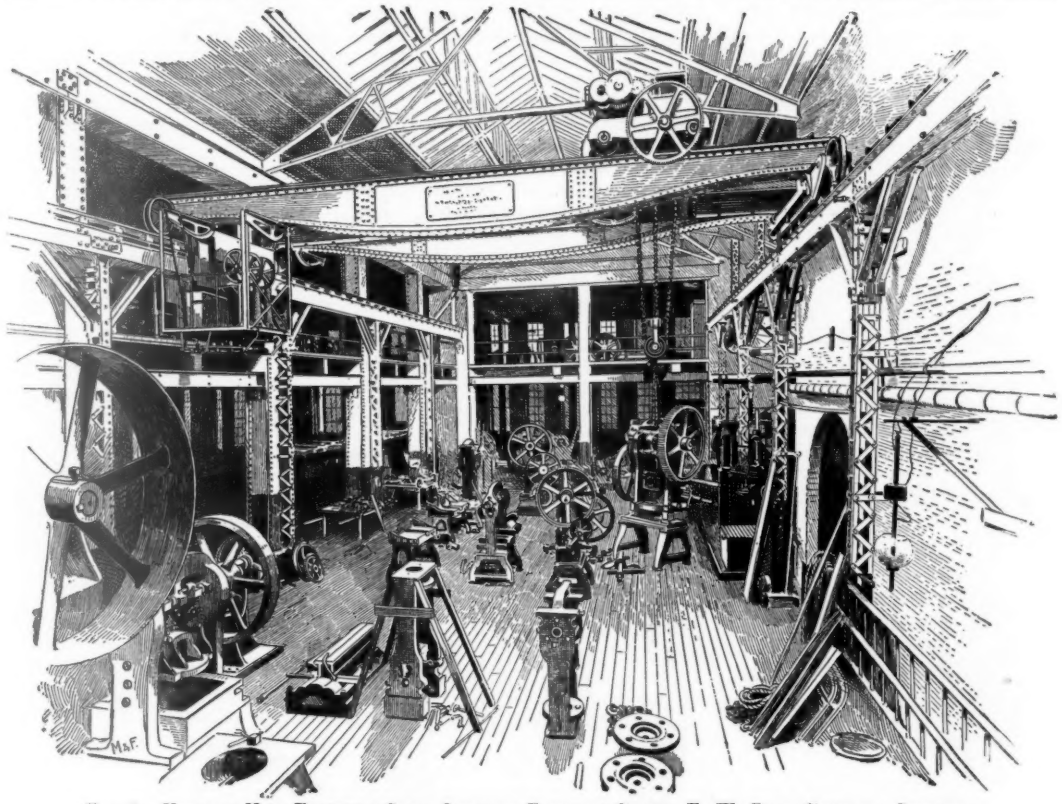


FIG. 2.—VIEW IN NEW ERECTING SHOP, SHOWING ELECTRIC CRANE, E. W. BLISS COMPANY, LIMITED.

office and the second floor of the old building, as already mentioned.

It is provided with a hoist by which machines, boxes, etc., are loaded directly into the wagons below. Above the shipping department, and occupying what may be described as the third floor of the central building, is the pattern making department of the establishment.

Much is shown on the floor plans presented herewith that we have not described, but enough has been submitted to the attention of the reader to give him a clear conception of the excellent facilities which this concern at present possesses. The administration of the establishment has been attended to with equal care. There is a general superintendent and an assistant superintendent, besides a foreman on each floor or in each department. The business routine is likewise adequate, and in every respect the large business of the concern is carefully and adequately looked after.

Wightman Electric Motor Company Assigns.

A dispatch from Scranton, Pa., dated October 10, says that the Wightman Electric Motor Company, of which J. R. McKee, President Harrison's son-in-law, is the president, has assigned for the benefit of its creditors. Robert E. Dunston, of Hartford, is the manager of the company. Inability to collect moneys due is the cause. The company has an extensive plant and may be reorganized.

OBITUARY.

Frank P. Cox, the well-known telegrapher, died at his residence, in Washington, on October 13, of consumption. He was one time manager of the Bankers' and Merchants' Telegraph Company in Washington, but for the past three years had been employed at the Executive Mansion. Mr. Cox had been in failing health for several years. He leaves a widow and several children.

The powerful search-light now on Mt. Washington, N. H., will, it is said be removed this Winter to Mt. Wilson, Cal. Mr. L. H. Rogers, who installed the Mt. Washington plant will superintend the removal of the projector to California.

Detroit Electrical Works Secure a Large Railway Contract.

In the face of much competition, the Detroit Electrical Works have just secured the contract for equipping with electric power the Woodward avenue line of the Detroit Citizens' Street Railway Company. The awarding of the contract to them was due largely to the satisfactory manner in which the Jefferson avenue line, Detroit, which they equipped a short time ago, has operated.

The Detroit Electrical Works is to furnish the poles, wires, motors and all other adjuncts necessary for the line, and is to do all the work of putting them in place. About 300 poles will be needed, and they will be of the same pattern as those on Jefferson avenue. The poles alone cost in the neighborhood of $9,000. All the overhead equipment is to be of a heavier type than on Jefferson avenue.

Forty horse-power motors of the "Detroit" system will be placed in each of the 20 magnificent cars ordered by the company from the Pullman Company. The cars are to be larger and heavier than those in use on Jefferson avenue and they will be models of rolling architecture.

The contract calls for the completion of the road in 45 days from October 8.

With the heavy grooved rail and the magnificent rolling stock ordered by the company, the Woodward avenue line promises to be a model electric street railway. A stronger and smoother roadbed could hardly be imagined. The rails are heavier than those used by the Michigan Central Railroad Company on many of its branches, where 60-ton locomotives are used continually. They are laid on heavy ties in a bed of concrete, which insures perfect rigidity. There is no question but that the line will be much smoother than the Jefferson avenue line.

The cost of the Woodward avenue equipment will be about $100,000. This has been raised upon the personal credit of the directors, the commercial standing of the company being somewhat low now owing to litigation into which it has been drawn by the city.

Another improvement decided upon by the directors is a new car barn on Woodward avenue. The present wooden structure will be torn down and a commodious brick building will be erected in its place to accommodate the cars demanded by the large traffic of Woodward avenue.

Besides this contract, the Detroit Electrical Works has lately received an additional order—the sixth—from the Calumet Electric Street Railway Company, of Chicago, and have also been awarded the contract for the equipment of the Consolidated Street Railway Company's lines at Salina, Kan.

Notwithstanding the fact that the Detroit Electrical Works' plant has been enlarged so that the capacity is now three times what it was last year, they are still crowded to the utmost with orders for their standard railway equipments and railway generators.

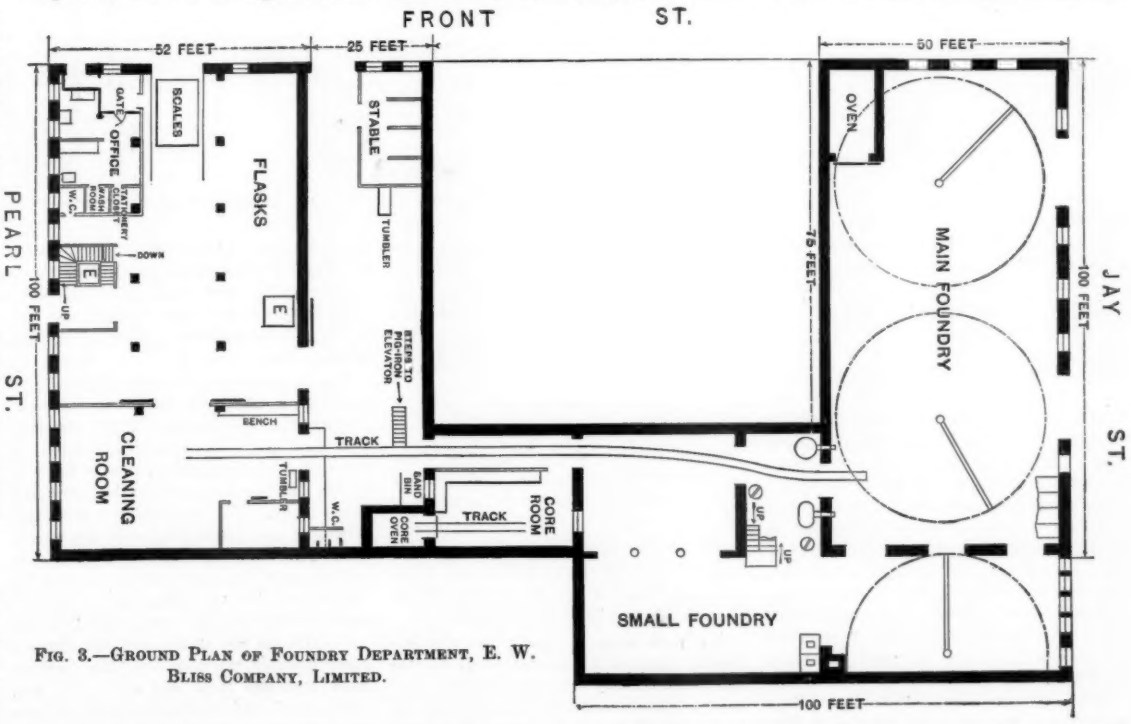


FIG. 3.—GROUND PLAN OF FOUNDRY DEPARTMENT, E. W. BLISS COMPANY, LIMITED.

The General Electric Company at the Cleveland Convention.

The exhibit which the General Electric Company will make at the Street Railway Convention promises to be of especial interest to street railway men. Among other things it will exhibit a magnificent new special car, which is probably the finest equipped street car that has ever yet been constructed. This car will have a single truck equipped with two 15 horse-power W. P. 30 motors, regulated by the latest type series parallel controller. They will also exhibit a fine long car mounted on double trucks, equipped with W. P. double 25 horse-power motors, with both forms of control. The car will be equipped with measuring instruments, so that the economy of each method of control can be compared. These cars will be run upon the lines of the East Cleveland Railway Company, and the General Electric Company will furnish tickets to interested visitors.

At the hall will be shown a truck equipped with two 15 horse-power W. P. motors connected with the series parallel controller so that the operation of the motors can be clearly inspected. A dissected W. P. 30 motor will constitute part of the exhibit, clearly showing its great simplicity. Motors of the S. R. G., S. R. F. and Edison No. 16 types will also be shown. In addition a complete line of the new overhead parts introduced by the General Electric Company will be displayed, showing many new features.

Magnificent decorations of incandescent lamps will be made, not only around the hall, but also at the Hollenden Hotel, while a beautiful souvenir hand-book, containing very valuable information on the general operation of electric railways, as well as covering the important features of the General Electric Company's apparatus, will be taken away by all the street railway men there.

It is estimated that over $4,000,000 was spent on the Columbus celebration in New York last week.

The Niagara Tunnel.

REMARKABLE DEVELOPMENT OF THE LOCALITY ABOUT IT.

Remarkable developments have taken place since active work was begun on the tunnel which is to harness the power of the famous cataract, says the New York *Sun*. Where two years ago there were rocks which had not been moved since the hardening of the earth's crust, is now a tunnel 6,700 feet in length, entirely lined with brick, and all completed save the portal. Where two years ago the solitary heron stood among the cattails, flourishing as they did when Father Hennepin first gazed in awe upon Niagara, now stands the greatest paper plant in the world.

What two years ago was a bucolic cornfield has been converted by an excavation into a $500,000 canal to feed the wheel-pits of the tunnel. Land along the river margin that two years ago was used as a cow pasture, has now a short railroad running through it that cost $140,000, destined to carry freight to and from the mills soon to be erected. A thousand feet of dockage will be built here next spring. On the 1,500 acres of land bought by the Tunnel Company before a drill was started, dozens of dwellings are now building, and $400,000 is ready to be used in sewering, grading, lighting and sidewalking this district. The tunnel portal will be completed by Nov. 1, and the hydraulic canal by Jan. 1. The Soo paper mill is hustling to complete its plant in order to begin operation by the first of the year.

But big as is the American tunnel scheme, it has a mate. The Canadian side of the river is to have a tunnel, too, though less has been said of this enterprise than of the other. The same company will develop the power on both sides of the river. It is expected that a tunnel 800 feet long on the Dominion bank will develop 100,000 horse-power, while a boring of 6,700 feet was necessary on the American side to obtain 120,000 horse-power. The British government will derive a revenue of $25,000 a year from the Canadian tunnel privilege, and the power, being generated in Queen Victoria's Park, must be transmitted to factories outside of the park, as the building of no mills will be permitted in the park preserves. Work will be begun on the Canadian tunnel early next spring, and it is hoped that motive force of at least 20,000 horse-power may be available a year from now.

It has been erroneously stated that work has already commenced on the Canadian tunnel. The truth is that a little tunnel is being constructed that will produce 2,000 horse-power, which is to be used to run the power house of the electric railway on the Canadian side. This tunnel is being excavated by the railway company.

For several reasons the purpose is to transmit to Buffalo the power that is generated on the Canadian side. First, it is expected that all the power that is developed by the American tunnel will be utilized by manufactories that will locate, as has the paper mill, at the Falls; second, it is not expected that the Canadians will or can use anything like 100,000 horse-power in factories on the Dominion riverside; third, the distance from the Canadian wheel-pits to Buffalo will be several miles less than from the American wheel-pits; fourth, the tariff laws will not permit Americans profitably to locate factories across the river, while, according to the rulings of the United States Treasury Department, electrical power may be entered free of duty. If power can be transmitted to Buffalo, without too costly diminution, the experiment will follow of wiring electrical energy to Hamilton, and perhaps even to Toronto, which city uses more electricity to-day, according to its population, than does Buffalo. Undoubtedly several factories will be erected by English capital near the Canadian power tunnel, as already the agents of corporations are on the ground pricing land.

The Tunnel Power Company promises to be one of the greatest monopolies of the age, for with exclusive rights on the Canadian side, and the ownership of all available land on the American margin, nobody can build a competitive tunnel without excavating under a very large chunk of the State of New York. The Tunnel Power Company practically have such a "cinch" on the territory that factories must locate on its lands in order to get connection with the wheel-pits and to secure shipping facilities.

In the matter of dockage, cribwork is now being constructed in eight or nine feet of water from the old hydraulic canal to the steamboat landing at Schlosser's dock. With a little dredging there will be a perfectly safe harbor just above the American rapids, with an open channel all the way to Tonawanda and Buffalo. This channel is now being improved by dredging, a $20,000 appropriation having been granted by Congress this year as a starter. The day will come, no doubt, when a harbor will stretch all the way from Black Rock to the Falls, taking in Tonawanda, Gratwick and La Salle. There is room here for all the vessels now afloat that carry the American flag at the masthead.

Meanwhile high authorities in the electrical world are wrestling with the problems of translation and transmission of energy. Professor Forbes, of London, the consulting electrical engineer of the Tunnel Power Company, has been here twice this year, each time spending much effort in passing upon the plans offered. Naturally there is much rivalry among makers of dynamos for the contract to furnish the power houses on the Canadian side. So much progress has been made in electrical science in the last two years as to beget confidence that when the tunnel is ready for its "harness" all problems connected with the buckles and straps will be solved.

ELECTRIC LIGHT FLASHES.

The Northwest General Electric Company has declared a 2 per cent. dividend on common stock, payable Oct. 15 to stock of Oct. 7.

The Edison Electric Illuminating Company of Brooklyn earned $43,641 net in the half year to June 30. Its bonded debt is $500,000 5's, and its stock $1,500,000.

George M. Hoag, the gentleman who was recently appointed superintendent of the Cleveland, O., city telegraph, recently submitted his first report to Director Gardner. In it he makes the startling statement that much of the electrical construction in the city is defective. Of the 176 light installations inspected only 20 are safe, he claims. The work of repairing the defects, Mr. Hoag says, is being pushed as rapidly as possible in the absence of a law to compel the companies to comply with the proper requirements.

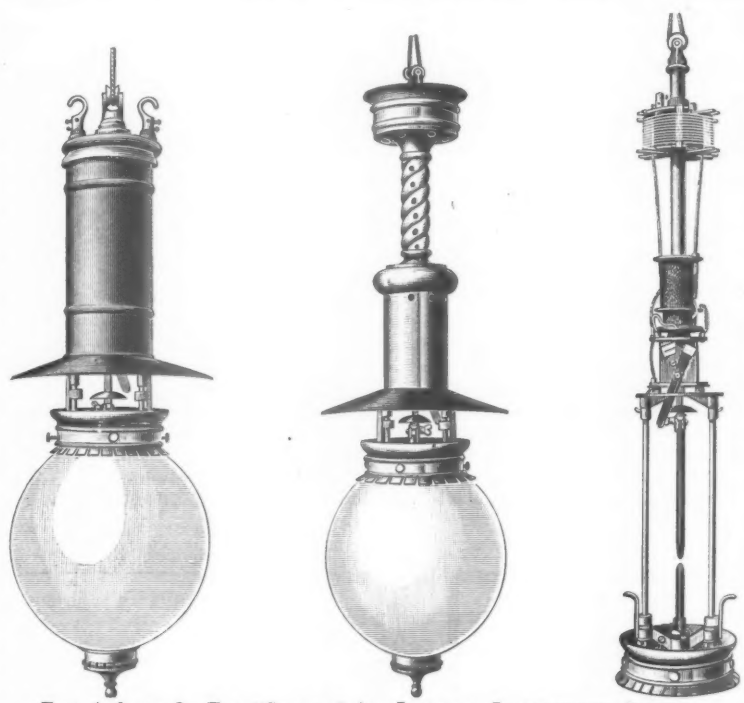
The Success Arc Lamp.

Both consumers and manufacturers have begun to recognize the fact that of all the devices for utilizing the electric current the arc lamp in appearance is the crudest and clumsiest in design, and are demanding a lamp of graceful, compact design and handsome finish.

Especially is this true where the arc lamp is brought into close proximity and comparison with the artistic and beautiful fixtures used in incandescent lighting. What is wanted, evidently, is a lamp whose standard design is artistic and graceful, and which shall cost no more than the present clumsy affair. With the object of fulfilling these conditions, Mr. S. L. Phillips, of 120 Liberty street, this city, has brought out the "Success" arc lamp, which has been designed specially to operate on incandescent circuits.

The lamp is illustrated in the accompanying engravings; Fig. 1 showing the type employed for inside lighting, which is ordinarily 36 inches long, but can, if required, be shortened to 22 inches and still give the full eight hour run. The lamp intended for outdoor use is shown in Fig. 2, being 32 inches long.

The mechanism of the lamp is clearly shown in Fig. 3. By a very ingenious device, the single eight-hour lamp is converted into a double or 14-hour lamp. This result is obtained by introducing a hollow lower carbon holder with a bayonet tripod cap. From this tube the lower carbon is fed upward, as the carbon burns away, by a spiral spring coiled beneath it.



FIGS. 1, 2 AND 3.—THE "SUCCESS" ARC LAMP FOR INCANDESCENT CIRCUITS.

The characteristic feature of the lamp is its simple mechanism, and the fact that no compensation springs, weights or dash pots are used. The carbon rack is fed by a simple clock train, and is raised or lowered by the difference in pull of the main and shunt coils. The carbons are normally separated and maintained so by the weight of the solenoid core, which has a pawl upon its lower end that plays into the teeth of the pinion and lifts the rack. When the current is turned on, the shunt coil lifts this core, releases the pinion, and the carbons come together, the main coil then immediately separates them and strikes the arc. The main and shunt coils are placed one above the other, and the carbon rack passes through the center of both of them and through the core just described.

The lamp is wound with its proper resistance, and for isolated plants or electric railway circuits, where the potential is likely to vary, an extra resistance equal to the resistance of the arc is provided, which is automatically cut in, in case the lamp goes out, thus saving the shunt coil from burning out.

The lamp being wound for the voltage it is intended to be used on, and being a purely differential lamp, cannot get out of adjustment, and hence requires no regulating; and no means for regulating are provided, thus doing away with the possibility of derangement at the hands of trimmers and inexperienced men in the station. The insulation of the lamp is very complete, so that exposed parts can be readily handled, and the lamp itself is completely protected from grounds. The resistances are wound entirely upon fire-proof material, and ventilated so that overheating cannot occur. Each lamp is provided with a specially designed and patented snap-switch.

These lamps can be run singly, two in series, ten in series, or five in series, from the outside wires of an Edison three-wire circuit, and can be wound for any amperage, however low. They are nominally wound for seven to eight amperes and 45 volts.

TELEGRAPH NEWS.

The Postal Telegraph Company has moved into its new office at Augusta, Ga.

The Postal Telegraph Company is about to open an office in Passaic, N. J., in charge of George H. Ackerman.

The Western Union Company has erected a special wire for press dispatches from Columbia, S. C., to Washington.

The executive committee of the Western Union Company will meet Tuesday, October 25, to take action on the distribution of stock dividend.

The work of stringing the telegraph wires along the Great Northern Railway is progressing with the track laying. A telegraph office is maintained in a car fitted up for that purpose.

The Western Union Telegraph Company has purchased the Phœnix building, owned by the Phœnix Insurance Company of Brooklyn. It will be remodeled to provide extra operating rooms to cope with the increasing business of the company. It is understood that the consideration was $1,200,000.

A press dispatch from the mining camp of Cripple Creek, Colo., dated September 22, says:

The Postal Telegraph Company opened its office here this morning, the new line having just been completed from Colorado Springs, a distance of 30 miles. The Cripple Creek wire is a branch from the through line to Leadville which the Postal is now building.

The Boston Stock Exchange has made a new contract with the United Telegram Company, which took effect October 1, by which the ticker service will be furnished its members at the rate of $20 for the New York ticker and $15 for the Boston ticker, or $30 per month when both instruments are taken. At present the price of New York tickers is $15 per month and Boston tickers $15 per month.

The Navy Department has issued a new table of cable rates of the world. A chart of the world is published, on which the submarine cables are indicated, with the principal communicating land lines and the seacoast stations. Detailed maps are also given of the telegraph accommodations in Central America and the West Indies, in Eastern Europe, and in the Mediterranean countries. The tables of cable rates include Atlantic cables, the Cuba, Bahama, Bermuda, African, European, Asiatic and South American. It appears that it costs more to send messages to the West Indies than it does to places in Africa. All the important places in Africa are now reached by telegraph, and you can sit in Gila Bend, Arizona, and communicate with business men at Asaah for $1.31 per word. If you want to reach anybody in Venezuela from New York, it will cost $3.64 per word, and then the message must go by mail from Guayaquil. The islands in the Pacific are now about the only places with which immediate communication by telegraph cannot be had.

ADVANCE INFORMATION.

New Electric Companies Formed and Important Constructions Projected.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week:

New Electric Railways.

JERSEY CITY, N. J.—The Jersey City and Bergen Railroad Company has been granted permission by the State Board of Subway Commissioners to equip its lines in Jersey City and Bayonne with electricity.

SEATTLE, WASH.—The River Valley Electric Railway Company has been incorporated, with a capital stock of $250,000.

MILWAUKEE, WIS.—The Board of Managers of the National Homes for Disabled Soldiers has voted to give right-of-way through the Milwaukee National Home Grounds for an extension of the electric car system of Milwaukee.

ELIZABETH, N. J.—The Elizabeth and Plainfield Street Railway Company has been incorporated, with a capital stock of $100,000, by James B. McGiffert, William H. Peddle, J. H. Vail, Luther M. Whitaker and others. The road will be seven miles in length, will be operated by electricity, and will run from Elizabeth to Westfield.

NEWARK, N. J.—Arrangements for a new company to give electric car service through the property of the Newark Land and Improvement Company have been so far advanced that a meeting will be held shortly to form the organization. It is expected that an arrangement will be made with the New Jersey Traction Company to operate the road.

TROY, N. Y.—The Troy and Lansingburg Street Railway Company recently sold out its stock at $225 per share. It is understood that the road will be leased by the Troy City Railway Company, which will operate all the electric roads in the city. Among the directors of the Troy City Company are Edward Murphy, Jr., William Kemp and Charles Cleminshaw, of Troy, and Anthony N. Brady, of Albany.

SING SING, N. Y.—The Sing Sing Electric Road Company has given the contract for the construction of the same to Lake & McGonigal, of Hudson.

OAKLAND, CAL.—The Twenty-third Avenue Electric Railway Company, capital stock, $300,000; incorporators, William J. Landers, H. W. Meek, A. C. Hammond, Jr., and B. C. Hawyes.

DAYTON, O.—The Dayton Street Railway Company has decided to equip its Third street line with electricity.

PATERSON, N. J.—The Paterson and Passaic Electric Railway Company; F. C. Van Dyke, president, and Jas. E. Morrissee, secretary; and the Passaic, Rutherford and Carlstadt Electric Railway Company; Chas. A. Johnson, president, and James A. Morrissee, vice-president, have been incorporated to build two electric lines between the points named in their corporate titles.

HUNTSVILLE, ALA.—W. S. Wells has been granted a franchise to build a street railway here.

KANSAS CITY, MO.—The Westinghouse Electric Company is negotiating with the Northeast Street Railway Company for the sale, to that company, of a complete new electric equipment.

BALTIMORE, MD.—Peter A. B. Widener, Wm. L. Elkins, and other members of the Philadelphia Traction Syndicate, are considering plans for the proposed boulevard and electric railway between Baltimore and Washington. The company has secured right of way to Washington.

SHERBROOKE, CAN.—A. J. Corriveau, of Montreal, has made a proposition to the city council to construct an electric railway in this city. He asks exemption from all taxation for a certain time, as well as the exclusive right to run an electric railway in the city for 30 years.

EVERETT, WASH.—The money has all been raised for the construction of an electric railway here, and for the purpose of putting in a complete plant for lighting the city by electricity.

GRASS VALLEY, CAL.—George A. Hare has applied to the Nevada county supervisors for a franchise to build an electric railway from Grass Valley to Nevada City.

ST. PAUL, MINN.—Grand Forks Electric Street Railway Company; capital, $100,000. Promoters, C. F. Arral, W. G. De Celle, F. C. Stevens.

Electric Light and Power.

COOPERSTOWN, N. Y.—The Cooperstown Electric Company, capital, $12,500, has been incorporated with Oliver Butler, Cooperstown; Robt. E. Drake, Paul T. Brady, Syracuse; Charles B. Staats, Frederick E. Wadhams, Albany; as directors.

MONTREAL, CAN.—The Montreal Auer Incandescent Light Company; capital, $1,000,000. Incorporators, H. G. Granger, of Philadelphia, W. J. White, A. W. P. Buchanan, and others, of Montreal.

WARRENSBURG, MO.—The Warrensburg Electric Light & Power Company's plant was burned October 3. Loss, $20,000; no insurance.

AMITYVILLE, L. I., N. Y.—The Amityville Electric Light Company; capital stock, 20,000. Directors, Steven R. Williams, Joel S. Davis, Wm. Blake, and others.

HEARNE, TEXAS.—Hearne Electric Light Company; capital, $10,000. Promoters, Peter L. Brady, Mary Brady and Em. Brady.

RAVENSWOOD, ILL.—Ravenswood Electric Company; capital, $10,000. Promoters, Preston W. Gray, Harry O. MacKenzie.

BUTTE, MONT.—The Butte General Electric Company; capital, $600,000. Incorporators, Henry M. Byllesby and Howard C. Levis, of St. Paul, Minn., and Jesse B. Wharton, of Butte. The principal office will be in St. Paul.

CLEVELAND, O.—The Cleveland General Electric Company, to manufacture and sell electricity for light, heat and power; capital, $25,000. Incorporators, Andrew Squire, J. H. Dempsey, Harrison B. McGraw and Lon M. Snyder.

CHICAGO, ILL.—The Columbian Electric Gas Company; capital, $500,000. Incorporators, John H. Carruthers, Wm. E. Briggs and John Irvine.

CLEVELAND, O.—The Universal Electric Company, N. S. Possons, president, is an applicant for a franchise to erect an electric light plant. The company proposes to supply incandescent lights for houses and arc lights for the streets of the East End.

ST. JOSEPH, MO.—Receiver Owens, of the St. Joseph Street Railway and Power Company, has petitioned the Circuit Court for authority to improve the electrical plant and purchase a quantity of new machinery.

ST. JOSEPH, MO.—Frederick Von Paul is president of the New Citizens' Electric Light and Power Company, which will furnish light and power to private houses and be a competitor of the Municipal Company.

HAMBURG, PA.—The Hamburg Electric Light, Heat and Power Company has increased its capital stock from $15,000 to $20,000.

PACIFIC GROVE, CAL.—Pacific Grove Electric Light and Power Company; capital, $60,000. Promoters, Nathan C. Carnull, Geo. W. Hopkins, of San Francisco, and H. N. Bryant, Henry E. Hunt and Wm. H. Chapman, of Pacific Grove, Cal.

REDLANDS, CAL.—Redlands Electric Light and Power Company; capital, $200,000. Promoters, Geo. B. Ellis, H. H. Sinclair, Geo. H. Crafts, F. G. Fernaud, G. A. Cook, B. J. Watus and Jas. F. Drake.

CHICAGO, ILL.—Electric Power Company of Wilmington; capital, $1,000,000. Promoters, Charles B. Holmes, Joseph E. Truitt, James Anthony.

ROCHESTER, N. Y.—Citizens' Light and Power Company; capital, $150,000. Promotors, James W. Gillis, Robert M. Myers, H. Wheeler Davis.

New Manufacturing Companies.

OTTAWA, CAN.—The Ahearn Electric Heating and Manufacturing Company (Limited); capital, $250,000. Incorporators, Thomas Ahearn, J. W. McRae, G. P. Brophy and William Scott.

SWAN'S CURRENT INDICATOR.

BARBERTON, O.—The Barberton Electric Company has been incorporated with a capital of $40,000.

PORTLAND, ME.—The Electric Manufacturing and Construction Company; to manufacture electrical appliances; capital, $25,000. W. M. Thayer, of Boston, is president and treasurer.

INDIANAPOLIS, IND.—The Commercial Electric Company; capital, $20,000. Promoters, J. R. Evans, S. Lee Hadley and Alton D. Adams.

NEW YORK CITY.—The Empire Electric Company, capital, $25,000, has been incorporated for the purpose of manufacturing and dealing in all kinds of electrical appliances. Directors, Walter K. Freeman and Henry Seldner, of New York city, and Dwight S. Woodworth, of Boston, Mass.

MINNEAPOLIS, MINN.—The Cooper-Hampton Electric Company is to be reorganized and incorporated as a manufacturing concern with a capital of $500,000. The new company will manufacture electric pumps and later the business will be extended to include the manufacture of electric elevators, street cars, etc. The incorporators are J. S. Pillsbury, John Martin, Chas. H. Chadbourne, S. C. Gale, George P. Hampton and others.

CLINTON, WIS.—The Standard Electric Company, of Clinton; capital, $20,000. Promoters, L. Lush, A. Woodward, E. Opperman.

EAST ST. LOUIS, MO.—Herman-Rabich Fan and Motor Manufacturing Company, East St. Louis; capital, $10,000. Incorporators, Bruno B. Hermann, William Rabich and George Karne.

MANSFIELD, O.—The Mansfield Electrical Manufacturing Company, which was incorporated recently with a capital of $50,000, has organized by the election of Reid Carpenter as president, and Frank B. Black, secretary and treasurer. The company will manufacture all kinds of supplies for electric railways.

SPRINGFIELD, N. J.—The Nassau Electrical Manufacturing Company; capital, $70,000. Incorporators, Andros B. Stone and Phillip Hathaway, of New York city; Wm. D. Marvel, of Flushing, N. Y., and M. S. Rosenweld, of Springfield. The plant will be in Springfield, with the main office in New York city.

DENVER, COLO.—The Wichita-Wilder Duplex Electric Burglar Alarm and Messenger Company; capital, $50,000. Directors, R. H. Smith, J. P. Moore and A. C. Walden, of Wichita, Kan., and W. L. W. Miller, of Denver.

PHILADELPHIA, PA.—The Helios Electric Company; to manufacture electrical appliances; capital, $150,000. Incorporators, D. C. Spruance, Frank S. Marr, Thomas Johnson and Thomas Spencer.

Swan's Current Indicator.

This indicator, for use on arc circuits, was invented and patented by Mr. F. A. Swan, of Boston, Mass., and has been in constant and satisfactory use in various central and isolated electric light stations throughout New England since its first introduction. In construction it is simple, durable and reliable. The mechanism consists of a solenoid placed vertically; a soft iron cylindrical core or armature capable of vertical, but with no more lateral motion than is necessary to allow perfect freedom of the core to respond to the the varying influence of the current passing through the coil. To the armature, at the top end, is connected a multiplying arrangement whereby the movement of the core, which is very slight, is magnified so that a variation of one-half an ampere will throw a pointer or hand about six inches to either side of the zero, or normal running point. The long movement of the hand and large white dial enables the working of any circuit, in which the indicator is included, to be easily seen. At the lower end of the core is a piston which works in a dash-pot filled with glycerine to prevent too rapid and erratic movement of the pointer. Incidentally, it may be mentioned, that the Boston Electric Light Company, of Boston, Mass., has over 50 of these indicators in use on its circuits. Swan & Lane, 193 Summer street, Boston, Mass., manufacture this device.

TELEPHONE CHAT.

E. D. Trowbridge, of the *Detroit Free Press*, has been engaged by the Long Distance Telephone Company for manager of their Detroit office.

Before long the Chicago Telephone Company will issue an order that all the girls in the operating department must wear black uniforms. This is for the purpose of giving the operating-room a more artistic appearance.

It is understood that the Erie Telegraph and Telephone Company will place behind its half million bond issue, with the Boston Safe Deposit and Trust Company, of Boston, the following securities: 14,000 shares of stock of the Northwestern Telephone Exchange Company; 14,000 shares of stock of the Southwestern Telegraph and Telephone Company; 6,000 shares of stock of the Cleveland Telephone Company. According to the last sale of these securities, the value back of the bonds would be $2,000,000.

Andrew J. Guise and Robert Guise, respectively, father and son, claiming Baltimore, Md., as their home, guests at the Alhambra Hotel, Chicago, are the projectors of a movement having as its ultimate end the reduction of telephone tolls in the State of Illinois. They have been circulating subscription books among business men soliciting $15 from telephone users, which will be used to pay the expense of obtaining legislation in Illinois that will reduce rentals from $150 to $60 per year.

KINDRED INTERESTS

The New York and Ohio Company, Warren, O., manufacturers of the Packard incandescent lamp, are adding to their force of machinists, and have just installed a nickel plating plant in their establishment.

The Builders' Iron Foundry, of Providence, R. I., has recently shipped, for test at Sandy Hook, the first of the eight 12-inch mortar carriages for which they have a contract with the United States government. These carriages are large and powerful pieces of mechanism, and are to be used for coast defense. The total weight of each is about 42 tons.

The Electrical Railway Engineering Company, Room 88, 180 Summer street, Boston, of which Mr. J. F. McGowan is manager, announce that they have secured a corps of competent engineers and are prepared to do general engineering for the designing and construction of power plants for electric railways, lighting and other stations, also steam plants and water powers.

Prizes Offered by the "United States Investor."

The *United States Investor* has decided to offer $1,000 in prizes for essays of not more than one column each respecting American cities and towns.

We take pleasure in announcing that the following distinguished gentlemen have consented to act as judges to award these prizes:

Hon. Henry Cabot Lodge, of Massachusetts.

Hon. Charles F. Crisp, of Georgia.

Hon. Julius C. Burrows, of Michigan.

The prizes will be subdivided as follows:

For the best essay respecting any American city or town, $500; for the second best essay respecting any American city or town, $300; for the third best essay respecting any American city or town, $200.

Each essay is to deal with the merits of the city or town chosen as its subject, either as a desirable place of residence; as affording opportunities for investment; as a place of peculiar location; as a place of unusual rapid growth; as a place in which an unusually large amount of capital and labor is employed in any particular industry; as a place possessed of great undeveloped resources, such as water power, coal and iron, etc., which is peculiar because it has long escaped attention; as a place of great historical interest; or as possessing any other claim to unique interest or special distinction.

In awarding the prizes, the judges will consider the literary merits of the essays, as well as the merits of the town or city described. They will not, however, go outside of the essay itself for evidence that the town or city possesses any special interest. Any claims which even a well-known city may have to distinction within the intent upon which these prizes are offered must rest wholly upon what is said by the essayist within the space of column allotted to him. This condition, together with the consideration of literary merit, will give the essayists an even chance. All the essays which are intended for competition should be marked as such and forwarded to either of the offices of the *United States Investor*, 19 Pearl street, Boston; 335 Broadway, New York; 241 Chestnut street, Philadelphia.

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